



Moving to 100 Percent: Renewable Energy Transition Pathways Analysis for Buncombe County and the City of Asheville

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CADMUS

Authors

The Cadmus Group

Kelly Kneeland, Arielle Magliulo, Kalee Whitehouse, and Trevor Clifford

Advisory Support from Ryan Cook, Julie Curti, Paul Faeth, Chad Laurent of the Cadmus Group, and Jennifer Weiss from the Climate and Energy Program of the Duke University Nicholas Institute for Environmental Policy Solutions

Acknowledgements

Buncombe County

Jeremiah LeRoy

City of Asheville

Bridget Herring

Amber Weaver

Municipal Advisory Committee

Jade Dundas, City of Asheville

Walter Ear, City of Asheville

Ronnie Lunsford, Buncombe County

Michael Mace, Buncombe County

Kristy Smith, Buncombe County

Community Advisory Committee

Pat Deck, Neighborhood Advisory Committee Member

Michelle Myers, West North Carolina Renewables Coalition

John Noor, Sustainability Committee on Energy and the Environment Member

Alesha Reardon, Energy Manager, Buncombe County Schools

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Terry Albrecht, Waste Reduction Partners

Rebecca Brothers, Rasheeda McDaniels, and Aisha Shepherd, Buncombe County

Adam Colette, Dogwood Alliance

John Coon, Asheville Airport

Barbara Darby, Mountain Area Workforce Development Board

Lucia Daugherty, SPARC Foundation

Chris Dobbins, and Bill Eaker, Land of Sky Regional Council

Ron Edgerton, Sierra Club

Beth Gentry, Heath Moody, and Dirk Wilmoth, AB Tech

Jane Hatley, Self-Help Credit Union

Brenda Mills, City of Asheville

Sophie Mullinax, and Sam Ruark-Eastes, Blue Horizons Project and Energy Innovation Task Force

Rich Olejniczak, Mountain Housing Opportunities

Paul Reeves, Habitat for Humanity

Brad Rouse, Energy Savers Network and Energy Innovation Task Force

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Acronyms

AVERT	Avoided Emissions generAtion Tool
COBRA	Co-Benefits Risk Assessment
DEC	Duke Energy Carolinas
DEP	Duke Energy Progress
DER	Distributed Energy Resources
EDF	Environmental Defense Fund
EE	Energy Efficiency
EEC	Energy Efficiency Credits
EIA	U.S. Energy Information Administrator
EITF	Energy Innovation Task Force
GSA	Green Source Advantage
HB	House Bill
IOU	Investor Owned Utility
IRP	Integrated Resource Plan
JEDI	Jobs and Economic Development Impact Models
kW	Kilowatt
kWh	Kilowatt Hour
LMI	Low to Medium Income
MW	Megawatt
MWh	Megawatt hour
NC	North Carolina
NCUC	North Carolina Utilities Commission
PPA	Power Purchase Agreement
PV	Photovoltaic
RE	Renewable Energy
REPS	Renewable Energy and Efficiency Portfolio Standard
REC	Renewable Energy Certificate
RFP	Request for Proposals
SRI	Socially Responsible Investment
UNC	University of North Carolina

Executive Summary

Renewable Energy Goals

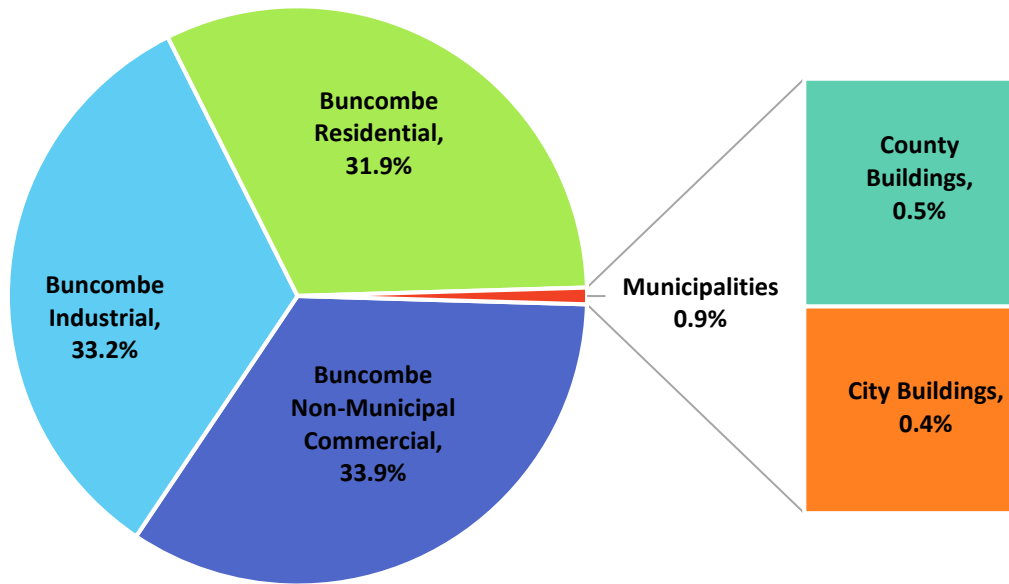
In 2018, a community-driven effort resulted in Buncombe County and the City of Asheville setting ambitious renewable energy transition goals, meant to transform the region’s energy supply, reflect the community’s dedication to environmental and social good, and demonstrate climate leadership within North Carolina. These goals are bold, with interim municipal operations goals to be achieved within eleven years, and a county-wide goal to be achieved in 23 years. These goals not only look at electricity, but also include the transition of building and transportation fuels to renewables by 2042, with interim goals set for local government operations by 2030. This report focuses primarily on pathways to transition the County and City buildings to a renewable electricity supply. Transitioning transportation and thermal technology to renewable sources are important subjects for future planning efforts, and these transitions will benefit greatly from having renewable electricity supply in place.

Buncombe County Goals	City of Asheville Goals
 <p>Utilization of 100 percent renewable energy for County operations by 2030</p>	 <p>Transition municipal operations from fossil fuel energy sources to 100 percent renewable energy by December 31, 2030</p>
 <p>Utilization of 100 percent renewable energy for the entire County by 2042 (residential, commercial, industrial, nonprofit)</p>	

Current Energy Consumption and Renewables

In 2018, renewable energy represented about 4.5 percent of energy used by buildings county-wide. These renewable electricity sources include solar and hydroelectricity, and distributed generation. Duke Energy Progress currently serves the majority of Buncombe County with electricity, and Dominion Energy provides natural gas. In 2030, if the City and County achieve 100 percent renewable energy in municipal buildings, it will represent about one percent of the community-wide energy consumption based on today’s figures (see **Figure 1**).

Figure 1: 2018 Energy Consumption Across Buncombe County



Based on expected generating capacity changes by the utilities, this report estimates that by 2030, renewables will only make up 5 percent of the overall energy consumption in Buncombe County, with little additional change expected by 2042. Without immediate community action, progress towards these ambitious goals will be stagnated.

Key Findings

- **The community-wide goal cannot be achieved through local government action alone.** The City and the County have limited influence on the community-wide goal as it will require the action of businesses, residents, municipalities, and industrial entities within the County. There are actions that the City and County can take to support progress towards these goals, but this effort will largely need to be driven by the state, utilities, and community-members.
- **State and utility-level actions to increase renewable energy in the utility power mix and support renewable energy market development can have the greatest impacts on progress towards the municipal and community-wide goals.** Actions at the state-level can significantly impact the energy mixes of the County and City. These actions are not within the direct control of the local government and will need additional action by the state and utilities.
- **The City and the County can reach the 2030 municipal renewable energy goals through renewable energy certificates alone.** This pathway would represent a large annual cost of about \$24,000 to the City and \$36,000 to the County to purchase renewable energy certificates to match current energy use. These actions may not necessarily have a local benefit if projects are elsewhere in the state or country. Local actions and state-level actions focused on encouraging more renewable energy generation can ultimately reduce the amount of REC purchases needed and encourage more renewable energy development locally. For more information on RECs, see policy description D.1.

Box 1: What it Would Theoretically Take to Achieve 100 Percent Renewable Electricity

Buncombe County's and the City of Asheville's renewable energy goals extend beyond building electricity use and include the transition of transportation fuels and thermal energy to renewable sources. However, because transportation and thermal transitions to renewable energy are largely dependent on the availability of renewable electricity, this report focuses on strategies to transition the electricity supply to renewable sources as an important step towards the achievement of the larger goals.

Assuming the business-as-usual scenario discussed further in this report, it would theoretically take the following measures to transition the electricity supply to renewable sources for County, City, and community buildings:



- 10,600 MWh*** of renewable electricity in 2030 for County buildings, which is roughly equal to:
- 8 MW of solar energy systems; OR
 - 630 rooftop solar systems; OR
 - 47 acres of land for ground-mounted solar energy systems.

*this number is in addition to the 5 MW Solar Farm planned to be installed at the Buncombe County Landfill.



- 16,200 MWh** of renewable electricity in 2030 for City buildings, which is roughly equal to:
- 12 MW of solar energy systems; OR
 - 960 rooftop solar systems; OR
 - 73 acres of land for ground-mounted solar energy systems.



- 3,125,000 MWh** of renewable electricity in 2042 community-wide for buildings, which is roughly equal to:
- 2,300 MW of solar energy systems; OR
 - 183,600 rooftop solar systems; OR
 - 29,600 acres of land for ground-mounted solar energy systems.

Action Plan

Based on best practices, stakeholder priorities and feedback, and analysis, this report outlines ongoing and near, medium, and long-term actions to support the renewable energy transition in building energy. These actions include those within the local government's direct control to support or implement (which includes providing support to specific community actions), and potential changes at the state level that could help support Buncombe County's 2030 and 2042 goals, and the City's 2030 goal. The action plans for the County and the City include the following actions:

- **Actions with a focus on what the County or City are already doing or undertaking.** This pathway includes actions that the County and City can directly enable and implement to support both the municipal and community-wide goals. For example, the County and the City are interested in increasing the amount of renewable energy generated on municipal sites, and within the County itself by partnering with partners and institutions within the community to procure renewable energy systems locally.

- **Actions with impacts local to Buncombe County and with high feasibility.** This includes actions that the City and County can enable or support locally that encourage renewable energy generation within the County and have lower barriers to implementation. The County and the City for instance are exploring opportunities to update municipal building energy policies to include renewable energy on all municipal construction going forward.
- **State-level actions that can support local renewable energy goals.** This pathway includes potential changes to state-level policies and regulation that are aimed at increasing renewable energy in the utility mix, providing more financing opportunities to residents and businesses, and encouraging the development of renewable energy projects. For example, continued engagement in the Cities Initiative by the County and City will help drive renewable energy action at the state level and impact renewable energy goals (see **Box 4**).
- **Actions that rely on alternative purchasing as opposed to local generation of renewable energy.** These actions are focused on ways in which residents, businesses, and local governments can purchase renewable energy using renewable energy certificates and other types of green power purchases. For example, the City and the County are both interested in exploring opportunities to purchase renewable energy certificates through Duke Energy Progress' [Green Source Advantage Program](#).
- **Capacity-building strategies that support the local renewable energy market and transition.** This set of actions, while not modeled for energy impacts, are aimed at supporting the local renewable energy market, educating community-members, and enabling a local workforce. For example, the City and County can continue to support the implementation of the Blue Horizons Campaign which aims to drive energy efficiency within the community (see **Box 4**).
- **Actions to be further explored through collaborative mechanisms.** This pathway of actions includes those which are not seen as immediately feasible or require collaborative efforts with community organizations such as the Energy Innovation Task Force, or with statewide organizations like the Department of Environmental Quality. The City and the County are both interested in opportunities to engage with utilities to drive progress towards the renewable energy goals and working with the state in the implementation of [Executive Order 80 and the Clean Energy Plan](#).

In order for progress to occur towards the 2030 and 2042 goals, the City of Asheville and Buncombe County governments will need to invest in renewable energy through onsite generation or renewable energy certificates, work with entities outside of the local government to also purchase renewable energy and support statewide and utility action, and continue to drive action through community involvement, education, and training.

Organization of this Report

This report includes the following sections:

- **Introduction and Background.** Provides an overview of the renewable energy goals and scope of this report.
- **Approach and Methodology.** Provides an overview of the project approach and sources for information.
- **Regulatory Context.** An overview of the current regulatory landscape in North Carolina, Buncombe County, and the City of Asheville, including relevant laws, regulations, and the current power mix as it relates to renewable energy.
- **Current Energy Consumption and Baseline.** This section details current energy consumption within Buncombe County, and estimates the future renewable energy mix if no further action is taken by the City or County.
- **Local Priorities for the Renewable Energy Transition.** Details on the local priorities for the renewable energy transition based on community inputs collected during this project. This section also supplies detail on the evaluation criteria derived from local priorities and used for the policy analysis.
- **Pathways for the Renewable Energy Transition.** Outlines the selection and evaluation of potential City and County actions to work towards the renewable energy goals.
- **City of Asheville Action Steps for 2030.** This section outlines key takeaways from the analysis for the City's municipal energy goal and potential actions the City can take near-, medium-, and long-term.
- **Buncombe County Action Steps for 2030.** This section outlines key takeaways from the analysis for the County's municipal energy goal and potential actions the County can take near-, medium-, and long-term.
- **Buncombe County Action Steps for 2042.** This section outlines key takeaways from the analysis for the County's community-wide renewable energy goal and potential actions the County can take near-, medium-, and long-term.
- **Appendices.** The appendices provide additional details on the policy analysis, the assumptions used for the data modeling, and the summary memos from the January workshops.

Introduction and Background

Buncombe County and the City of Asheville's Renewable Energy Goals

In 2018, Buncombe County and the City of Asheville each set ambitious goals to transition energy consumed in the County to low carbon and renewable energy sources. Buncombe County's resolution creates a 100 percent renewable energy goal for county municipal operations by 2030, and a 100 percent renewable energy goal for the entire community's energy use by 2042. The City of Asheville, which is located within Buncombe County, passed a resolution that sets a 100 percent renewable energy goal for city municipal operations by December 31, 2030.

Box 2: What is renewable energy?

Renewable energy is broadly defined as a fuel or energy supply that does not get depleted when used.¹ According to North Carolina's renewable energy portfolio standard, renewable technologies include solar water heat, solar space heat, geothermal electric, solar thermal electric, solar thermal process heat, solar photovoltaics, wind, biomass, hydrogen, combined heat and power, landfill gas, tidal, wave, hydroelectric, and anaerobic digestion.²

North Carolina's definition of renewable energy does not include nuclear energy, although it is low carbon and does make up over 25 percent of North Carolina's energy mix (see **Table 2**). Additionally, 75 percent of respondents to a survey conducted by the County and City said that they do not consider nuclear energy to be "clean" energy.

Objective and Scope of this Report

This analysis identifies potential actions and policies that Buncombe County and the City of Asheville could implement to meet the renewable energy goals. These actions and policies were evaluated against priorities established by local stakeholders, potential energy impact, cost to the County or City, and feasibility within the current policy context. This report outlines pathways for both Buncombe County and the City of Asheville for making progress towards their renewable energy goals.

While natural gas represents 41 percent of community-wide energy consumption in buildings, this analysis focused primarily on strategies related to transitioning the electricity supply to renewable energy.

Transitioning away from natural gas will require investments in building electrification and heating and cooling technologies, which will be a long-term effort and will benefit from having a renewable electricity supply in place.

Although this report focuses on strategies for transitioning the electricity supply to renewable energy, the County and City will continue to emphasize energy efficiency, and will explore pathways to transition of transportation and thermal technology to electric and renewable energy to meet the 100 percent renewable energy goals.

¹ Renewable energy is defined by the U.S. Energy Information Administration as "energy from sources that are naturally replenishing but flow-limited; renewable resources are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time." Available at: https://www.eia.gov/energyexplained/?page=renewable_home

² Renewable Energy and Energy Efficiency Portfolio Standard (REPS), N.C. G.S. § 62-133.8.a.8, retrieved from https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_62/GS_62-133.8.html

Box 3: Fuel Switching Challenges

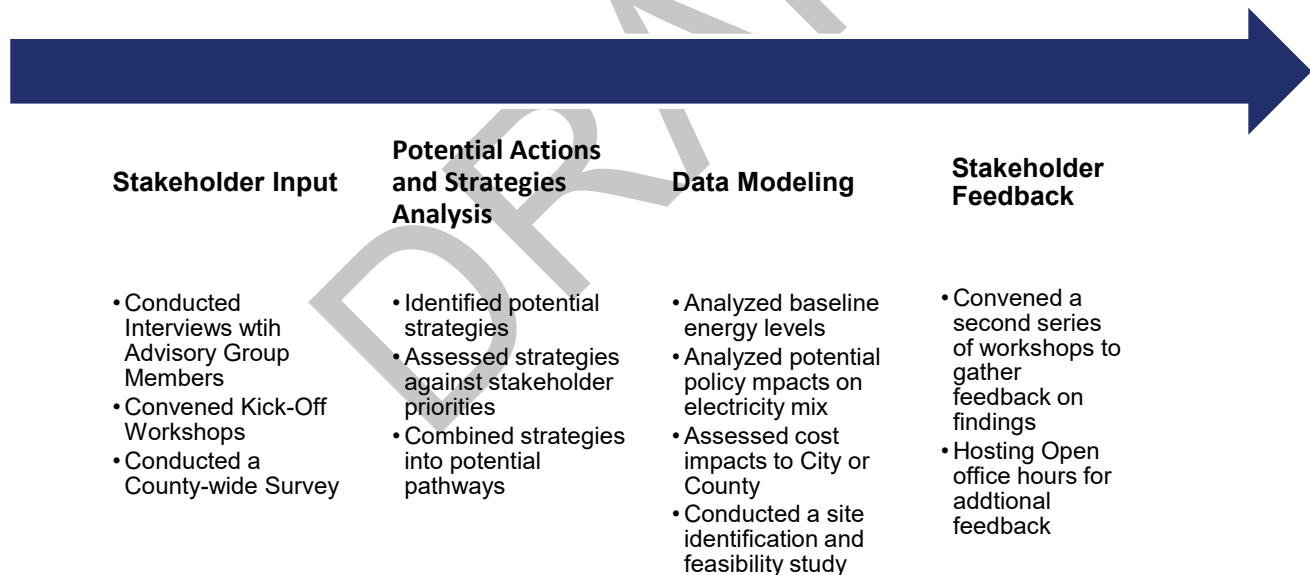
Many facilities throughout Buncombe County rely on fossil-fuels for heating. Switching to renewable energy fuels and electrifying buildings are the key ways in which these loads will need to transition to renewable sources.

At current market prices, there may be some economic challenges in replacing gas heat. For example, converting a home's energy inputs from natural gas to electricity could require both service (e.g., distribution line) and appliance (e.g., water and space heating) upgrades, which could require upgrades to expand the capacity of the electric service panel to accommodate new load requirements.³ The greatest challenge to electrification is cost-effectiveness. With the current residential rate for natural gas in Asheville at \$1.50 per therm⁴ and the rate for electricity at \$0.11 per kWh,⁵ a very high-efficiency air source heat pump would cost the same to use as an 80 percent efficient gas furnace; indicating limited return on investment.⁶

Approach and Methodology

Local governments across the United States are employing different strategies to transition to more renewable energy. These strategies all have different ranges of impact depending on contextual factors such as the type of utility, state regulation and policy, political feasibility, and implementation factors. The intention of this report is to provide Buncombe County and the City of Asheville with actionable strategies given their unique political landscape, and an understanding of how state-level changes might affect the renewable energy transition.

Figure 2: Project Process



³ City of Palo Alto. (2018). City of Palo Alto 2019 Title 24 Energy Reach Code Cost Effectiveness Analysis (DRAFT). Retrieved from <http://cityofpaloalto.org/civicax/filebank/documents/66742>

⁴ Natural Gas Local. Asheville, North Carolina, Gas Rates. Retrieved on 7.2.2019 from <https://naturalgaslocal.com/states/north-carolina/asheville/>

⁵ Duke Energy. (2019). RESIDENTIAL SERVICE SCHEDULE RES-53. Retrieved from https://www.duke-energy.com/_/media/pdfs/for-your-home/rates/electric-nc/r1ncschedulesresdep.pdf?la=en

⁶ City of Palo Alto. (2018). City of Palo Alto 2019 Title 24 Energy Reach Code Cost Effectiveness Analysis (DRAFT). Retrieved from <http://cityofpaloalto.org/civicax/filebank/documents/66742>

The strategies found in this report are based on the following:

1. **Policy Research:** The Project Team conducted research on the local policy context and drew on Cadmus' *Pathways to 100* policy primer⁷ to develop a preliminary set of 36 potential program and policy options.
2. **Stakeholder Input.** Members of organizations within the community, municipal staff, and residents supplied feedback on potential strategies, opportunities and barriers within Buncombe County and the City of Asheville to work towards the renewable energy goals. Stakeholders provided feedback through the following means:
 - *Intake interviews with Advisory Committee Members:* The Project Team conducted eight intake interviews with members of the Municipal and Community Advisory Committees to understand the current opportunities, challenges, and priorities surrounding the renewable energy transition at the County and City levels.
 - *Municipal Advisory Committee:* The Municipal Advisory Committee includes County and City municipal staff who handle facilities management and capital planning. The Municipal Advisory Committee met in January 2019 and again in June 2019. During these workshops, staff discussed potential actions and priorities for the renewable energy transition in municipal facilities that would enable progress towards both the County and City's municipal goals.
 - *Community Advisory Committee:* The Community Advisory Committee includes community members who are involved in energy, environmental, or community organization within the City and County. This group convened in January 2019 to discuss potential actions and priorities for the community-wide renewable energy transition that responds to the County's 2042 goal.
 - *Stakeholder Workshops:* Members from both committees and additional stakeholders from local community, environmental organizations and businesses met in January and June of 2019. In January, stakeholders participated in an exercise to envision the County and City in 2042, which helped to identify stakeholder priorities for the renewable energy transition. In June, these members provided feedback on the evaluation and analysis of potential actions.
 - *County-wide Survey:* Shortly after the three January workshops, the County and City opened an online survey to obtain perspectives on the renewable energy transition from the broader community in Buncombe County. The survey was available from February 27, 2019 to March 15, 2019 and advertised through municipal outreach efforts. There were 935 respondents to the survey.

Findings from the Stakeholder Workshops are available in **Appendix C** of this report.

3. **Policy Analysis.** Stakeholders identified ways they hoped the renewable energy transition would impact the community. In particular, stakeholders noted that the City and County should draw from strategies that are equitable, have positive environmental impacts, encourage local generation, and help demonstrate the City's and County's leadership. These priorities, in addition to scale, feasibility, and cost to the City and County, were used to evaluate the potential strategies to understand the potential impacts to the community (See Local Priorities for the Renewable Energy Transition). This

⁷ The *Pathways to 100: An Energy Supply Transformation Primer for U.S. Cities* is available here: <https://cadmusgroup.com/papers-reports/pathways-to-100-an-energy-supply-transformation-primer-for-u-s-cities/>

analysis also draws from the *Pathways to 100* report,⁸ and examples of strategies implemented in other communities in the U.S.

4. **Categorizing Strategies into Pathways.** In addition to evaluating strategies based on the key priorities mentioned above, the analysis further categorized the actions to yield six potential categories or “pathways” of strategies based on these criteria:
- *Pathway A:* Actions already being undertaken by the County and/or City
 - *Pathway B:* Local actions identified as feasible and high priority
 - *Pathway C:* State and utility actions
 - *Pathway D:* Alternative purchasing options
 - *Collaborative Community Actions:* Community efforts such as the Energy Innovation Task Force are well suited to address and investigate (not modeled). For information on EITF, see **Box 4**.
 - *Capacity-Building Strategies:* Actions that are important to the renewable energy transition but create renewable energy impacts that are difficult to quantify (not modeled)

Details on this evaluation are available in the Pathways for the Renewable Energy Transition section of this report.

5. **Power Mix Modeling.** To determine the impact that various policy pathways would have on the County and City’s municipal goals and the County’s community-wide goal, this analysis examined the energy supply to County and City municipal buildings and to all other buildings within Buncombe County. This included the electricity supply from Duke Energy Progress, the current distributed electricity generation within the County and City, and the natural gas supply from Dominion Energy (formerly PSNC). The resulting power mix model projects the amount of renewable energy in the City and County’s site energy consumption as well as the community-wide site energy consumption under several scenarios: if Pathways A through D were implemented; or if the City, County, or state took no actions (baseline scenario). The model includes assumptions for each strategy including the cost to implement, the timeline for implementation or frequency of occurrence, and the expected energy mix impact. These assumptions are outlined in **Appendix B**.

⁸ The *Pathways to 100* policy primer is available here: <https://cadmusgroup.com/papers-reports/pathways-to-100-an-energy-supply-transformation-primer-for-u-s-cities/>

Regulatory Context

State Regulatory Context

North Carolina has a regulated utility market, meaning utilities function as monopolies within certain territories and are regulated by the North Carolina Utilities Commission (NCUC). In Buncombe County, Duke Energy Progress (DEP) is the main electric utility and Dominion Energy (formerly PSNC) is the gas utility. Because residents, businesses, and local governments collectively purchase most of their energy from these utilities, their energy mix will reflect the energy mix that the utilities offer. Therefore, utilities that incorporate a limited amount of renewable energy into their energy mix limit the amount of renewable energy on the grid. Residents, businesses, and local governments do have other options outside of the utility to gain more control over their energy mix and increase the amount of renewable energy they use. Many of these options are explored in further depth in the Potential Pathways section of this report.

There are several state policies and programs that both support and limit renewable energy development in North Carolina. Examples of some supportive state-level policies are below, while a snapshot of what is allowed and not yet in place in North Carolina is provided in **Figure 3**.

- **North Carolina GHG Targets and Climate Plan** was established by Executive Order no. 80 in October 2018. This policy commits North Carolina to the 2015 Paris Climate Agreement by setting a greenhouse gas reduction target of 40 percent below 2005 levels by 2025. In addition, the plan aims to increase the number of registered zero-emission vehicles to at least 80,000, aims to reduce energy consumption by square foot in state-owned buildings by at least 40 percent from 2002-2003 levels, and requires state agencies to incorporate climate change planning into their programs and operations.
For more information, please visit the North Carolina Department of Environmental Quality page on this topic, available [here](#).
- **North Carolina Renewable Energy and Energy Efficiency Portfolio Standard (REPS)** requires all investor-owned utilities in the state to supply 12.5 percent of 2020 retail electricity sales in North Carolina from eligible renewable and efficient energy resources by 2021 (see **Box 2** for information on eligible renewable energy resources). However, this requirement also permits utilities to meet some of this requirement through energy efficiency credits (EECs), which reduces the amount of *renewable energy* utilities are required to utilize through the REPS. Currently, DEP is allowed to meet 25 percent of the REPS requirement through energy efficiency credits (EECs), and will be allowed to meet 40 percent of the REPS requirement through EECs in 2021. DEP easily meets the 25 percent cap, and is banking EECs to also meet the 40 percent cap in 2021. As the time of the most recent REPS annual report, DEP was in compliance with the REPS requirements.⁹
For more information, please visit the North Carolina Utilities Commission page on this topic, available [here](#).
- **Net Metering for Solar Systems.** Net metering is also required by state law and allows for solar energy system owners to be compensated for excess energy (up to 20 kW for residential or 1,000 kW for non-residential) their solar system puts onto the grid.¹⁰

⁹ Annual Report Regarding Renewable Energy and Energy Efficiency Portfolio Standard in North Carolina Required Pursuant to N.C.G.S. § 62-133.8(j), October 1 2018, available at <https://www.ncuc.net/reports/repsreport2018.pdf>

¹⁰ Distributed Resources Access Act, N.C. G.S § 62-126.3, retrieved from https://www.ncleg.net/enactedlegislation/statutes/html/bychapter/chapter_62.html

For more information on net metering, please visit Duke’s informational page on this topic, available [here](#).

- **North Carolina Competitive Energy Solutions Plan** was established by HB 589 in 2017. This bill requires the investor-owned utilities (IOUs) to create several programs in North Carolina impacting renewable energy, including:¹¹
 - **Solar Leasing.** This bill creates a framework for solar leasing in North Carolina (but not third-party ownership).¹² Ratepayers can now lease solar panels from their utility rather than owning them outright.
 - **Competitive Procurement.** The bill requires Duke Energy (both DEP and DEC) to procure 2,660 MW of renewable energy over a 45-month period through a competitive procurement process.
 - **Community solar.** The bill requires Duke Energy to offer 40 MW of community solar in North Carolina (DEP must offer 20 MW in its territory and Duke Energy Carolinas must also offer 20 MW in its territory). Participants are reimbursed at DEP’s avoided cost rate for energy generated by their portion of the community solar facility.¹³ The details of this program are still being determined through a formal docket process at the NCUC.
 - **Solar Rebate Program.** The program provides customers a one-time rebate per watt depending on the size of the solar energy system and type of customer. Residential systems less than 10kW can receive up to 60 cents per watt, nonprofits with solar energy systems can receive 75 cents per watt, and commercial businesses with solar energy systems can receive 50 cents per watt.¹⁴ The program also features an annual cap of 20MW per year for five years, with 10 MW of that reserved for residential customers and 5 MW reserved for non-profit organizations each year. For the past two years, the cap has been met very quickly, and rebates are currently not readily available to applicants because there is an extensive waiting list.
 - **Green Source Advantage (GSA) Program.** This bill also creates a 600 MW program through which large businesses, universities, and the military can directly obtain renewable energy from renewable energy developers and purchase RECs.¹⁵ For more information on RECs, see policy description D.1. Out of the 600 MW allocated to Duke Energy (both DEP and DEC), 250 MW is reserved for the University of North Carolina (UNC) System and 100 MW for the military, leaving 250 MW “unreserved” for municipalities and corporations. Out of the remaining 250MW, 160 is allocated for DEC customers and 90 for DEP customers. Under this program, customers directly negotiate rates and terms with the developer, who then enters

¹¹ Note, this bill also creates a community solar program, but implementation has been delayed.

¹² Solar leasing and PPAs (third party ownership) are very similar in practice but differ in terms of financing structure. A solar lease provides power for a set lease payment amount per month, and the lessee essentially rents the solar system from the third-party owner. Under a PPA, the developer sells power to the buyer at a predetermined price per kWh. In North Carolina, buying and owning power from a third-party via a PPA is not permitted for utility customers, but leasing the system is permitted. See <https://www.energysage.com/solar/financing/solar-leases-and-solar-ppas/>.

¹³ General Assembly of North Carolina, Session 2017, House Bill 589, Competitive Energy Solutions for North Carolina, retrieved from <https://www.ncleg.net/Sessions/2017/Bills/House/PDF/H589v6.pdf>

¹⁴General Assembly of North Carolina, Session 2017, House Bill 589, Competitive Energy Solutions for North Carolina, retrieved from <https://www.ncleg.net/Sessions/2017/Bills/House/PDF/H589v6.pdf>; Dillon Davis, *See how much you would save in Duke Energy’s \$62 million solar rebate program*, January 22, 2018, retrieved from <https://www.citizen-times.com/story/news/local/2018/01/22/see-how-much-you-would-save-duke-energys-62-million-solar-rebate-program/1054692001/>

¹⁵ More specifically, the GSA program is available to large nonresidential customers with contract demand equal to or greater than one MW or aggregate demand at multiple service locations equal to or greater than 5 MW.

into a PPA with DEP for renewable energy that is transferred to DEP's grid. Customers receive the RECs for the renewable energy generated and bill credits for the nonrenewable energy displaced by renewable energy on their electricity bill.¹⁶ For more information on RECs, see policy description D.1. The program is currently under consideration by the NCUC and is expected to be available in the summer of 2019.¹⁷

For more information, please refer to the North Carolina Legislature Informational Summary of HB589, available [here](#).

- **Renewable Advantage program.** The Commission required Duke Energy to create this program during the GSA docket/application process as an alternative version of the GSA program that is available to smaller industrial, commercial, municipal and residential customers. The Renewable Advantage program enables these smaller customers to purchase Renewable Energy Certificates (RECs)¹⁸ by enrolling in Duke's Renewable Advantage Program (\$6 RECs that might not be "local") or in North Carolina GreenPower's large volume customer program (all local RECs) for \$10/REC. For more information on RECs, see policy description D.1.

For more information, please see the NCUC docket for this program, which is available [here](#).

- **Revolving loan programs.** North Carolina municipalities can create revolving loan programs (authorized by HB 1389 of 2009) to finance the purchase and installation of renewable energy and energy efficiency projects that are permanently attached to residential, commercial, or other real property.

For more information, please visit the state legislature's website, available [here](#).

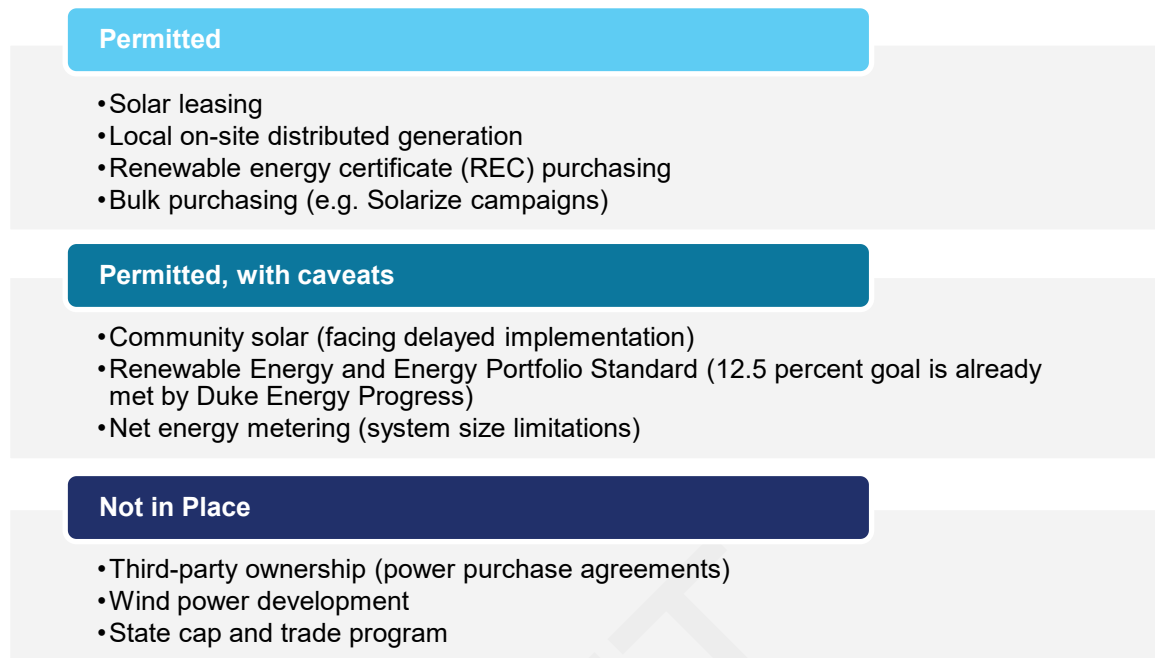
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¹⁶ Information about Duke Energy's Green Source Advantage Program retrieved from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage>

¹⁷ NC Green Source Advantage Program. (n.d.). Retrieved July 16, 2019, from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage>

¹⁸ Renewable Energy Certificates or Renewable Energy Credits (RECs) are produced when renewable energy is generated and delivered to the grid, and represent the environmental attributes of that renewable energy. RECs can be purchased or sold, and provide proof that the REC owner is using renewable energy without necessarily having to install renewable energy systems on their own property. For more information, see <https://www.energysage.com/alternative-energy-solutions/renewable-energy-credits-recs/what-are-renewable-energy-certificates-recs/>

Figure 3: State Context Snapshot



Relevant Local Policies and Initiatives

In addition to state-level policies and the 100 percent renewable energy goals, Buncombe County and the City of Asheville have taken steps locally related to renewable energy and low carbon efforts. This section highlights some of these programs and projects.

Buncombe County

Buncombe County has been working on several efforts to reduce carbon emissions, improve energy efficiency, and develop renewable energy. In 2013, the County commissioners endorsed a **carbon footprint reduction** of two percent each year until an 80 percent reduction is achieved.¹⁹ Buncombe County has also been working to **retrofit its buildings and schools with LED lighting** to improve energy efficiency and reduce energy costs.²⁰ In August 2018, the County approved an initiative to **lease the local capped landfill to Duke Energy to build a 5 MW solar energy system**, which will increase the amount of locally produced renewable energy on the grid.²¹ Buncombe County staff are active participants in local collaborative initiatives related to sustainability, greenhouse gas reduction, and energy efficiency.

City of Asheville

The City of Asheville has also taken recent actions to reduce carbon emissions, increase energy efficiency, and encourage renewable energy development. In 2007, Asheville passed a resolution that set a target of an 80 percent municipal **carbon footprint reduction** by 2050 from a 2008 baseline. As of 2017, the City has achieved

¹⁹ Frankel, J. (n.d.). Buncombe Commissioners set high bar for carbon reductions. Retrieved July 16, 2019, from https://mountainx.com/news/commissioners_set_high_bar_for_carbon_reductions/

²⁰ Sustainability Office. (n.d.). Retrieved July 16, 2019, from <https://www.buncombecounty.org/governing/depts/sustainability-office/default.aspx>

²¹ Wynne, K., & Santostasi, S. (2018, August 22). Buncombe County moves closer to turning retired landfill into solar farm. Retrieved July 16, 2019, from <https://wlos.com/news/local/buncombe-county-moves-closer-to-turning-retired-landfill-into-solar-farm>

a 31 percent reduction.²² In 2009, the City created a **Sustainability Management Plan** that outlines the sustainability goals for City Government related to transportation, facilities, management practices, water, waste, land use, GHG emissions, and employee education.²³ The City has changed all City **streetlights to LEDs**, which is projected to save \$450,000 annually. In 2018, the City achieved the **SolSmart Gold community designation** from the U.S. Department of Energy for being solar-friendly.²⁴ The City has a program to provide **rebates for building permits and plan reviews for certain renewable energy technologies** and green building certifications.²⁵ City staff also actively participate in local collaborative, and regional sustainability efforts, as well as national networks such as the Urban Sustainability Director's Network.

Utilities in Buncombe County

Buncombe County is primarily located within Duke Energy Progress territory for electricity service, and Dominion Energy territory for natural gas service. A small portion of the County receives its electricity service from the French Broad Electric Membership Corporation, a cooperative that provides service in western North Carolina and eastern Tennessee. Additionally, the City of Asheville's Mills River Water Treatment is located in Duke Energy Carolinas territory rather than Duke Energy Progress territory. Because Duke represents the large majority of electricity supply within the county, this analysis relies exclusively on data and projections related to Duke Energy Progress and does not incorporate any data from French Broad Electric Membership Corporation.

NCUC regulates investor-owned utilities within North Carolina, including Duke Energy Progress and Dominion Energy. The NCUC is a quasi-judicial state agency that regulates the utilities' rates and services, including the implementation of many state-level renewable energy policies.

Duke Energy Progress

DEP is an investor-owned utility and subsidiary of Duke Energy Corporation. DEP has several programs aimed at promoting renewable energy generation in the region and meeting the renewable energy and energy efficiency portfolio standard requirements, including net metering for solar systems, solar leasing, competitive procurement, community solar, solar rebates, and the green source advantage program. These programs are detailed in the **State Regulatory Context** section, above.

In addition to these programs, DEP is an active participant in the EITF and is a partner in the EITF's Blue Horizons Project. Through both programs, DEP is collaborating with Buncombe County and the City of Asheville to "transition the Duke Energy Progress – West Region to a cleaner, affordable, and smarter energy future, rooted in community engagement and collaboration," by researching and recommending energy efficiency and demand side management programs in Buncombe County,²⁶ and making energy efficiency measures more accessible throughout the community.²⁷

²² City of Asheville Resolution No. 18-278, retrieved from https://www.epa.gov/sites/production/files/2018-11/documents/step_1-asheville_re_resolution.pdf.

²³ AVLSustMGMTPlan.pdf. (n.d.). Retrieved July 16, 2019, from https://drive.google.com/file/d/1GzyhapFEMXfcHJ5BBaGEy3V_GJkY1hVo/view

²⁴ McDaniel, P. (2019, March 13). Asheville earns 'SolSmart Gold' designation for advancing solar energy growth. Retrieved July 16, 2019, from <https://ashevillenc.gov/news/asheville-earns-solsmart-gold-designation-for-advancing-solar-energy-growth/>

²⁵ DSIRE. (n.d.). Retrieved July 16, 2019, from <http://programs.dsireusa.org/system/program/detail/2748>

²⁶ The City of Asheville – Sustainability (n.d.). Retrieved July 16, 2019, from <https://www.ashevillenc.gov/department/sustainability/energy-innovation-task-force/>

²⁷ About The Project. (n.d.). Retrieved July 16, 2019, from <https://bluehorizonsproject.com/about-the-project/>

Dominion Energy

PSNC Energy was the primary natural gas provider for 25 of North Carolina's 100 counties, including Buncombe County. In 2019, PSNC merged with Virginia-based Dominion Energy, and is now Buncombe County's natural gas utility.²⁸ Natural gas currently accounts for 41 percent of the energy supply for buildings in Buncombe County (see **Figure 4** below). This energy supply source is also subject to the city and county renewable energy goals and will need to be transitioned to a renewable source in order for the County and City to fully meet their goals. Dominion Energy is currently working with Align RNG on an anaerobic digestion project focused on pig farms to produce five billion cubic feet of renewable natural gas annually by 2030.²⁹ Additionally, fuel switching and building electrification will be important options to consider in the future, especially once the electricity supply includes more renewable energy.

Box 4: Collaborative Initiatives

Local Collaboration

Energy Innovation Task Force: The Energy Innovation Task Force (EITF) was formed in 2016 as a joint initiative between the City of Asheville, Buncombe County, and Duke Energy Progress to delay or avoid construction of a natural gas powered combustion turbine power plant in Asheville, and to transition the region of Western North Carolina to a cleaner energy future through community engagement and collaboration.³⁰ The EITF includes members from environmental and clean energy organizations, local businesses, and institutions.³¹ The group has been successful in delaying the construction of a new peaker plant beyond 2023, and continues to work on strategies to reduce energy consumption. EITF's Blue Horizons Project is aimed at reducing energy consumption through energy efficiency measures.³² The project has helped to supply weatherization upgrades and retrofits for low-income homes, and helped residents and businesses reduce energy consumption and enroll in a local demand side management program within Buncombe County.³³

Blue Horizons Energy Upgrade Program: In 2019, Buncombe County and the City of Asheville launched the Buncombe County Home Energy Reduction Project, a joint initiative funded by the Southeast Sustainable Communities Fund. This project aims to weatherize and repair homes within Buncombe County to achieve higher energy efficiency, while also focusing on equity for outreach and access.³⁴

²⁸ Dominion Energy Dominion Energy does serve other parts of the country as an electric utility with supplies from wind, solar, natural gas, oil, and coal. <https://www.dominionenergy.com/ourpromise#>

²⁹ According to City correspondence with Dominion Energy.

³⁰ Energy Innovation Task Force. (n.d.). Retrieved July 16, 2019, from <https://www.ashevillenc.gov/department/sustainability/energy-innovation-task-force/>

³¹ Energy Innovation Task Force. (n.d.). Retrieved July 16, 2019, from <https://www.ashevillenc.gov/department/sustainability/energy-innovation-task-force/>

³² News & Events. (n.d.). Retrieved July 16, 2019, from <https://bluehorizonsproject.com/news-events/page/2/>

³³ Newsletters, July 2, 2019, Blue Horizons Project. Retrieved July 16, 2019 from <https://bluehorizonsproject.com/asheville-earns-honorable-mention-for-blue-horizons-project-from-us-conference-of-mayors/>

³⁴ Combining Warmth & Energy Savings in Buncombe County, NC. (2019, February 01). Retrieved July 16, 2019, from <http://www.southeastson.org/project/combining-warmth-energy-savings-in-buncombe-county-north-carolina-a-sscf-grantee-highlight/>

State-level Collaboration:

Cities Initiative: While many of the solutions and options analyzed in this report are local-level actions, some require changes to existing North Carolina legislative and regulatory policies. Buncombe County and the City of Asheville are currently part of a broader statewide effort to identify and prioritize barriers that local governments face in their efforts to achieve their renewable energy or GHG reduction goals. Environmental Defense Fund (EDF) met and facilitated the Cities Initiative in 2018 with the goal to identify consensus action items that could create opportunities and foster partnerships to achieve these goals.

The initial Cities Initiative priorities were determined by representatives from 12 cities and towns, many of which have already adopted renewable energy resolutions.³⁵ Additional cities and counties (including Buncombe County) have joined in the second phase of the work, continuing through 2020.

The group reached consensus on 12 action items in 2018, including three that are directly related to the options outlined in this report:

- **Allow for new renewable energy procurement options.** Today, NC statute only allows customers to purchase electricity from public utilities. The Cities Initiative participants are working together to develop strategies to allow for new renewable energy procurement options including third party sales and an improved Green Source Advantage program from Duke Energy.
- **Increase speed and transparency of the interconnection process.** Work with Duke Energy to identify optimal locations for distributed generation based on current grid infrastructure and provide early determinations to ensure that all interconnection requests are feasible.
- **Support the development of a green energy bank.** Work to support the development of a state clean energy fund that could fund a variety of renewable energy and efficiency efforts, including PACE and on-bill financing.

The work of the Cities Initiative participants continues in 2019. The continued involvement of representatives from the City of Asheville and Buncombe County will be instrumental in this effort.

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³⁵100% Resolutions. (n.d.). Retrieved July 1, 19, from <https://ncclimatesolutions.org/100-resolutions/>

Current Energy Consumption and Baseline

All residents, businesses and organizations in Asheville and Buncombe County consume energy. To better understand the scale of change that needs to occur to achieve the 2030 and 2042 renewable energy goals, it is important to understand the current breakdown of energy generation sources, utility projections for future energy generation, and what it would look like if no additional actions were taken between now and 2042. This analysis outlines the current energy generations sources throughout Buncombe County and the expected changes to the electricity supply via DEP through the year 2042.

Current Energy Consumption

This analysis looked at site-use energy, meaning that all numbers reflect what the County and City’s physical buildings consumed, based on their utility bills from DEP and Dominion. Site-use energy varies based on the type of technologies and hardware utilized at power plants and within each building.³⁶ Additionally, it is important to note that natural gas consumption cannot be directly converted over to electricity at a 1 to 1 rate, due to varying types of hardware and capacity factors.

In 2018, Buncombe County consumed 41 percent of its total energy through Dominion Power natural gas, with the remaining 59 percent representing DEP-sourced electricity.^{37,38} The majority of DEP’s electricity is supplied from nuclear, coal, and natural gas sources. A much smaller portion of DEP’s electricity comes from oil, solar, hydropower, energy efficiency, and distributed generation (see **Figure 4**). DEP purchases the majority of its solar from non-local sources through power purchase agreements (PPAs),³⁹ which are long-term contracts with third-party developers. DEP also owns a small amount of solar energy throughout the State, which accounts for 0.1 percent of the overall mix. The energy efficiency amounts represent the total electricity demand that DEP met through energy efficiency program investments. In 2018, **4.5 percent of the County’s overall site energy consumption was supplied by renewable energy.**

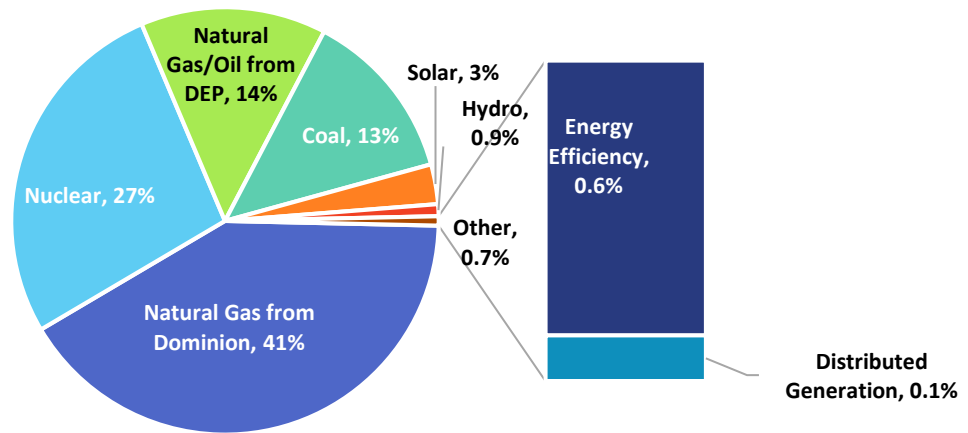
³⁶The difference between source and site energy. (n.d.). EnergyStar. Retrieved July 16, 2019, from <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/understand-metrics/difference>

³⁷ Duke Energy Progress 2018 Integrated Resource Plan, available at: <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=25fb3634-54b6-464b-9704-b6fe99cda1a8>

³⁸ Correspondence with Ryan Childress, Manager, Midstream at Dominion Energy

³⁹ A power purchase agreement is a contract between a third-party developer and a customer, where the customer purchases the power generated from the third-party-owned energy system.

Figure 4: Current Energy Mix in Buncombe County



Source: Duke Energy Progress 2018 Integrated Resource Plan, available [here](#).
Correspondence with Dominion Energy

Wind power does not currently comprise any part Buncombe County’s energy mix. Statewide, this gap can partly be attributed to The Competitive Energy Solutions Act for North Carolina, which included an 18-month moratorium on the issuance of new wind energy project permits.⁴⁰ This moratorium was established in part to give the General Assembly time to consider the impacts of future wind infrastructure on military operations and expired in December 2018. In western North Carolina, the Mountain Ridge Protection Act limits wind turbine construction in the region.⁴¹

The overall breakdown of natural gas to electricity consumption varies between the County and City municipal operations and community consumption. The City’s municipal buildings consume less total energy than the County’s municipal buildings. Electricity represented 61 percent of Asheville’s overall municipal site energy consumption in 2018 and 59 percent of Buncombe County’s overall municipal site energy consumption in 2018. The non-municipal Buncombe community consumed 99 percent of the total energy in 2018, with about half of that being fueled by electricity. See **Table 1** for a breakdown of these numbers. Overall, the City and County buildings together only make up 0.9 percent of the overall site energy consumption county-wide.

Table 1: Electricity vs. Natural Gas Usage Breakdown in Buncombe County

Entity	Electricity Usage 2018 (MWh)	Natural Gas Usage 2018 (therms)	Percent of Energy Supply that is from Electricity 2018
City (Municipal Buildings)	15,842	352,143	61 percent
County (Municipal Buildings)	17,006	403,672	59 percent
Community (Buildings)	3,026,276	100,135,321	51 percent

Source: Duke Energy Progress 2018 Integrated Resource Plan, available [here](#).
Source: Correspondence with Dominion Energy

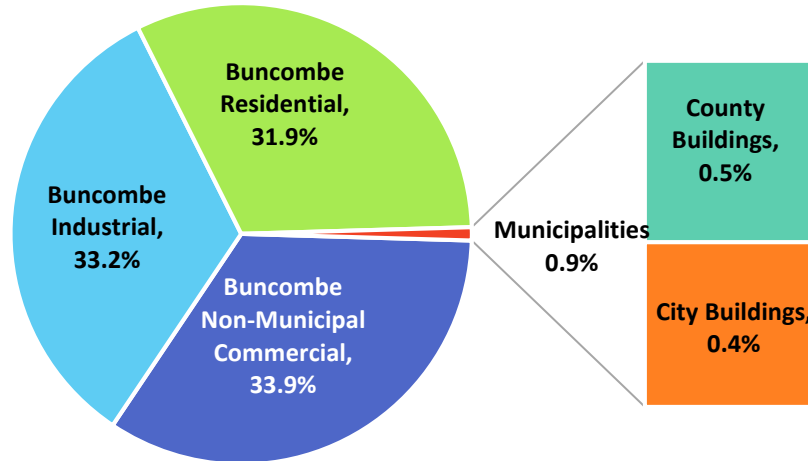
⁴⁰ General Assembly of North Carolina, Session 2017, House Bill 589, Competitive Energy Solutions for North Carolina, retrieved from <https://www.ncleg.net/Sessions/2017/Bills/House/PDF/H589v6.pdf>

⁴¹ Chapter 113A, Article 14: Mountain Ridge Protection Act, retrieved from https://www.ncleg.net/EnactedLegislation/Statutes/HTML/ByArticle/Chapter_113A/Article_14.html

As seen in **Figure 5**, energy consumption in Buncombe County is broken out relatively equally among residential, industrial, and non-municipal commercial customers. Energy consumed by County and City municipalities make up less than 1 percent of this overall consumption. This figure is an important part of the baseline understanding for how the City and County will work to meet their 2030 and 2042 goals.

Because municipal energy-use accounts for just 0.9 percent of the overall community energy consumption, a focus on the 2030 municipal goals for 100 percent renewable energy will only impact 0.9 percent of the overall community. To begin meeting the 2042 goal of 100 percent renewable energy throughout all of Buncombe County, the community must also start targeting the residential, industrial, and commercial customers that make up the other 99 percent of the County’s consumption.

Figure 5: 2018 Energy Consumption Across Buncombe County



Source: Correspondence with Duke Energy
Correspondence with Dominion Energy

Baseline Scenario

The purpose of a baseline scenario is to evaluate what the County and City’s electricity mix is likely to be in 2030 and 2042 if the City and County and state do not take any additional action. The baseline scenario maps the trajectory of the County and City’s municipal site consumption mixes and the county-wide energy mix until 2042 based on planned additions and retirements in DEP’s Integrated Resource Plan.⁴² The County and City currently receive a significant majority of their energy from DEP and Dominion, and this model assumes that this will continue.

Other Considerations in the Baseline Scenario

Since 2011, the average annual increase in energy consumption in North Carolina has been 0.85 percent, which is incorporated into the model.⁴³ As less information was available on Dominion’s planned changes to its natural gas supply, no changes were modeled, and the analysis assumes that the percentage of natural gas consumption from Dominion will remain consistent with 2018 levels. This analysis focuses on changes to the

⁴² DEP’s 2018 Integrated Resource Plan outlines Duke Energy Progress’ plans for meeting the energy needs of consumers within their territory over the next fifteen years. These plans have been filed with state utility regulatory commission.

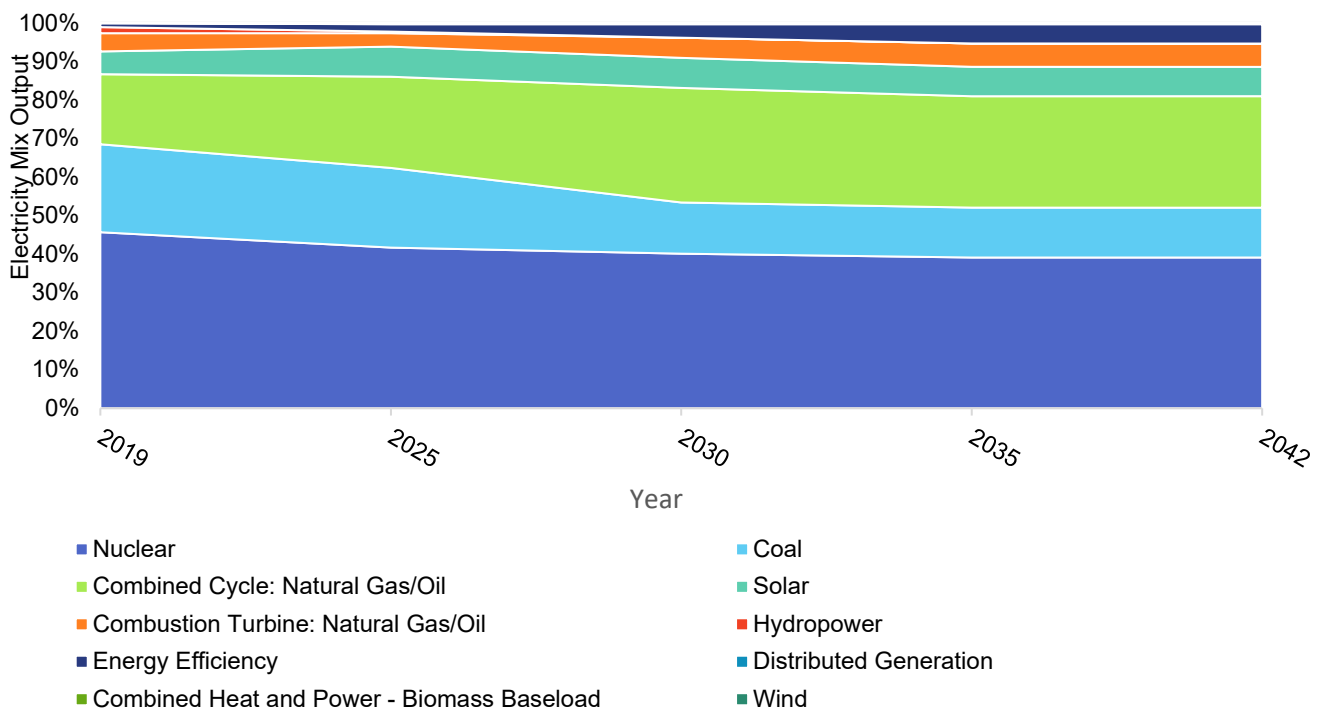
⁴³EIA, Annual Electricity Power Industry Report, Form EIA-861 detailed data files, October 2018, retrieved from <https://www.eia.gov/electricity/data/eia861/>

electricity supply, as changes to natural gas consumption will depend on fuel switching, building electrification, and changes at the utility to source from renewable natural gas sources.

Electricity Mix Changes

Changes to municipal and county-wide energy mixes are closely associated with DEP’s planned additions and retirements to its electricity generation assets. According to DEP’s 2018 Integrated Resource Plan,⁴⁴ 17 percent of the utility’s facilities will retire by 2030. These retirements include the majority of DEP’s hydropower and 33 percent of DEP’s coal generation. To replace these retirements, the utility expects to fill 12 percent of that need by natural gas or oil, and the remaining five percent will be replaced by solar, biomass, or energy efficiency. See **Figure 6** for a graph of DEP’s electricity mix breakdown between now and 2042.

Figure 6: Planned Electricity Mix for Duke Energy Progress Customers 2019-2042



Source: DEP 2018 Integrated Resource Plan, available [here](#).

Key Takeaways from DEP’s Baseline Electricity Mix:

- **By 2030:** DEP will largely source its electricity supply from nuclear energy (40 percent), with an increased amount (about 30 percent) from natural gas. Coal is expected to decrease to about 13 percent of the mix. Solar is expected to increase to 7.8 percent of the overall electricity mix.
- **By 2042:** DEP will still largely source its electricity from nuclear, natural gas, and coal production. Solar is estimated to make up 7.6 percent of the overall electricity mix from DEP. By 2042, it is expected that DEP will meet five percent of its overall electricity demand through investments in energy efficiency.

Table 2 includes a breakdown of the estimated site energy consumption mix through 2042. This is inclusive of both natural gas from Dominion, as well as DEP’s energy supply sources.

⁴⁴ DEP 2018 Integrated Resource Plan, retrieved from <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=25fb3634-54b6-464b-9704-b6fe99cda1a8>

Table 2: County-wide Energy Mix (all energy sources): Baseline Scenario

	Year	2020	2025	2030	2035	2040	2042
Natural Gas from Dominion		41.0%	41.0%	41.0%	41.0%	41.0%	41.0%
Nuclear		26.9%	24.6%	23.7%	23.1%	23.1%	23.1%
Natural Gas/Oil from DEP		13.1%	16.0%	20.6%	20.6%	20.6%	20.6%
Coal		13.4%	12.2%	7.8%	7.6%	7.6%	7.6%
Solar		3.9%	4.6%	4.6%	4.5%	4.5%	4.5%
Hydropower		0.9%	0.2%	0.0%	0.0%	0.0%	0.0%
Energy Efficiency		0.7%	1.1%	2.1%	3.0%	3.0%	3.0%
Distributed Generation		0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Combined Heat and Power - Biomass Baseload		0.0%	0.1%	0.1%	0.1%	0.1%	0.1%
Wind		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TOTAL		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Year	2020	2025	2030	2035	2040	2042
Percent Renewable		4.9%	5.0%	4.8%	4.7%	4.7%	4.7%
Percent Carbon-free (Includes Nuclear and EE)		32.4%	30.8%	30.5%	30.7%	30.7%	30.7%

Under its current plans, the County will receive about 5 percent of its energy from renewable sources by 2042. As discussed above, the County and City municipal operations and the broader Buncombe County community currently source most of their electricity from DEP. As a result, their electricity supply mirrors that of DEP’s energy mix, aside from a 5 MW solar project that is planned to be installed at the Buncombe County Landfill. Thus, under DEP’s current plans, the County and City’s renewable energy mix are projected to remain at about 5 percent through 2042. This baseline does not meet the County and City’s 100 percent renewable energy goals for 2030 and 2042. The **County, City, state, and utilities** must therefore work to bridge the current 95 percent gap between what is planned and the 100 percent renewable energy goals. The following section explores potential pathways that the City and County can take, and actions that could shift at the state and utility level, and their expected levels of impact.

Local Priorities for the Renewable Energy Transition

Buncombe County and the City of Asheville consulted with local stakeholders through workshops, interviews, and a public survey on their priorities for transitioning to 100 percent renewable energy. These stakeholders represented a range of organizations including Buncombe County, the City of Asheville, environmental organizations and initiatives, nonprofits, higher education, and community groups. Stakeholders named a range of impacts they hope the actions taken will have on the local governments and the broader community, including:

- **Local Renewable Energy Development.** Stakeholders emphasized the importance of locally developed renewable energy projects that would help the County and City achieve their renewable energy goals while supplying other local economic, health, environmental, and educational benefits. The specific definition of “local” varied among stakeholders who prioritized this issue. Twenty-one percent of survey respondents defined “local” renewable energy as energy generated within Buncombe County, 25 percent define it as being generated within North Carolina, and 24 percent defined it as within the Southeastern United States.⁴⁵ Workshop participants and interviewees noted the importance of involving the community within decision-making, as well as the importance of educating the community on renewable energy and energy efficiency as a means for more local renewable energy adoption.
- **Affordability and Equity.** Stakeholders emphasized that actions taken to increase the amount of renewable energy throughout the county should be affordable in terms of cost to tax- and ratepayers, and equitable in terms of the allocation of both costs and benefits. Equity was defined by stakeholders in several ways. First, equity means that low-income households should benefit from and not be burdened by additional costs for renewable energy access and efficiency measures (e.g. low- or no-cost options to participate). Stakeholders also defined equity as helping to make sure housing in the City and County is affordable, safe, and healthy and that air quality is clean for all. Finally, equity means that all voices need to be heard in planning and implementation processes, particularly those of communities of color and low-income households.
- **Efficiency First.** Stakeholders noted that the City and County should continue to prioritize energy efficiency technologies and behaviors to reduce overall energy consumption. As part of this, the City and County should help remove barriers to participation in efficiency and weatherization programs, particularly for low-income households.
- **Engagement and Collaboration with the Utilities.** Stakeholders noted the importance of engaging the utilities in discussions related to the renewable energy transition. Specifically, they expressed an interest in building on the work of the EITF and creating more incentives for local generation.
- **Environmental Issues.** Stakeholders identified concerns about the natural environment as a reason to support the renewable energy transition (i.e., by reducing greenhouse gas emissions), and as an important consideration in implementing strategies to increase renewable energy in the County’s energy mix. Stakeholders expressed an interest in renewable energy as a method of preserving the environment by reducing greenhouse gas emissions and helping to mitigate climate change, and hoped to see positive environmental impacts in the County, such as improved air quality and

⁴⁵ The final 30 percent of respondents noted that they did not care where the renewable energy was generated.

eventually reduced climate change impacts, as a result of implementing renewable energy throughout the County.

- **Resiliency.** Stakeholders expressed an interest in energy storage to improve the resiliency of both municipalities and the broader community, and to reduce dependence on the grid and less impacted in the event of grid failures.

Box 5: Survey Findings

Buncombe County and the City of Asheville released a survey to the community between February 27, 2019 to March 15, 2019. The survey had 935 respondents, with 94 percent of respondents living in Buncombe County.

75%

of survey respondents do not consider nuclear energy to be clean energy.

85%

of respondents think that the City and County should reinvest cost savings from renewable energy and energy efficiency into more renewable energy projects.

RESPONDENTS WERE EVENLY SPLIT ON THE DEFINITION OF “LOCAL” RENEWABLE ENERGY.

21.4%

of respondents think that “local” means energy generated in Buncombe County.

24.7%

of respondents think that “local” means energy generated in North Carolina.

23.8%

of respondents think that “local” means energy generated in the Southeastern US.

30.1%

of respondents are not concerned where renewable energy is generated.



DRY

Pathways for the Renewable Energy Transition

There are a number of strategies that communities across the country have taken to transition to a renewable energy future. This project identified an initial list of potential strategies that were assessed on the evaluation criteria and stakeholder priorities. In addition to understanding the feasibility of implementing these actions in Buncombe County given the current state policy context, as well as the potential scale and costs to the City and County, it was important to evaluate potential strategies with stakeholder priorities in mind. **Figure 7** outlines the details of the evaluation criteria. The full details of the policy analysis are available in **Appendix A**.

Box 6: Commitments to Renewable Energy Across the U.S.

Cities, towns, and counties across the United States are setting renewable energy targets and goals. As of 2019, Sierra Club's Ready for 100 tracker notes that five states and over 120 municipalities have committed to moving to more renewable energy.⁴⁶ These targets vary – with some focused solely on electricity, and others taking staggered approaches to electricity, heating, or transportation. Target years also vary between these communities, with some setting goals for 2025, 2030, 2040 and beyond. The City of Asheville and Buncombe County goals are considered ambitious because they include the transition of electricity, fuels, and transportation; include community-wide goals in addition to municipal ones; and have a shorter-time frame than many communities for the transition. Examples of other communities who have achieved their renewable electricity targets include:

- **Aspen, Colorado:** As of 2015, Aspen achieved 100 percent renewable electricity. Aspen's municipal utility was able to contract for large-scale wind, biogas, and hydropower to supply its energy.⁴⁷
- **Burlington, Vermont:** Burlington achieved 100 percent renewable electricity in 2014. In addition to receiving electricity from large hydropower (13 percent) and small hydropower projects (22.8 percent), Burlington Electric utilizes wood heating and wind power locally. Burlington Electric has also relied on the purchase of Renewable Energy Credits from wind power projects both in and out of state to maintain the renewable energy mix annually and control costs.⁴⁸
- **Georgetown, Texas:** As of 2017, Georgetown Texas has run on 100 percent renewable electricity. Georgetown's municipal utility was able to contract for large-scale solar and wind power to match and exceed consumer demand.⁴⁹

While these communities have all taken separate pathways to achieve their renewable energy goals, there are a few commonalities. For instance, each of these municipalities have municipal utilities; they each rely

⁴⁶ Sierra Club, Ready for 100 Map, retrieved from <https://www.sierraclub.org/articles/2019/05/100-percent-clean-energy-new-normal>

⁴⁷ Hood, G. (2017, July 05). It's Not Easy, But Aspen Moves Toward 100 Percent Renewable Energy. Retrieved July 16, 2019, from <https://www.npr.org/2017/07/05/535578438/aspen-moves-toward-its-goal-of-supporting-100-percent-renewable-energy>

⁴⁸ Our Energy Portfolio. (n.d.). Retrieved July 16, 2019, from <https://www.burlingtonelectric.com/our-energy-portfolio>

⁴⁹ Archived. (n.d.). Retrieved July 16, 2019, from <https://georgetown.org/2019/02/22/why-georgetown-is-100-percent-renewable/>

on multiple types of technologies; and they look in, and out of state for their renewable energy supply. Lastly, each of these communities focused primarily on transitioning their electricity supply as opposed to thermal and transportation fuels.

North Carolina

At least 19 communities across North Carolina have adopted renewable energy goals, each of which include varying targets and years.⁵⁰ For example, Wake County adopted a resolution in October 2018 supporting a 100 percent transition to clean energy by 2050.⁵¹ Durham County adopted a resolution in November 2018 supporting a 100 percent transition to clean, renewable energy by December 31, 2050 and 80 percent by 2030.⁵²

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⁵⁰ Ouzts, E. (2019, February 14). Cities' climate goals may be out of reach without state, utility support. Retrieved July 16, 2019, from <https://energynews.us/2019/02/13/southeast/n-c-cities-want-to-lead-on-clean-energy-but-theyll-need-help-to-meet-goals/>

⁵¹ Wake County, North Carolina. (2018). 2018 Clean Energy by 2050 Resolution. Retrieved from <http://www.wakegov.com/energy/Documents/2018%20Clean%20Energy%20by%202050%20-RES.pdf>

⁵² Durham County, North Carolina. (2018). Durham County Renewable Energy Resolution. Retrieved from <https://durhamnc.gov/DocumentCenter/View/24710/Durham-County-Renewable-Energy-Resolution-November-13-2018>

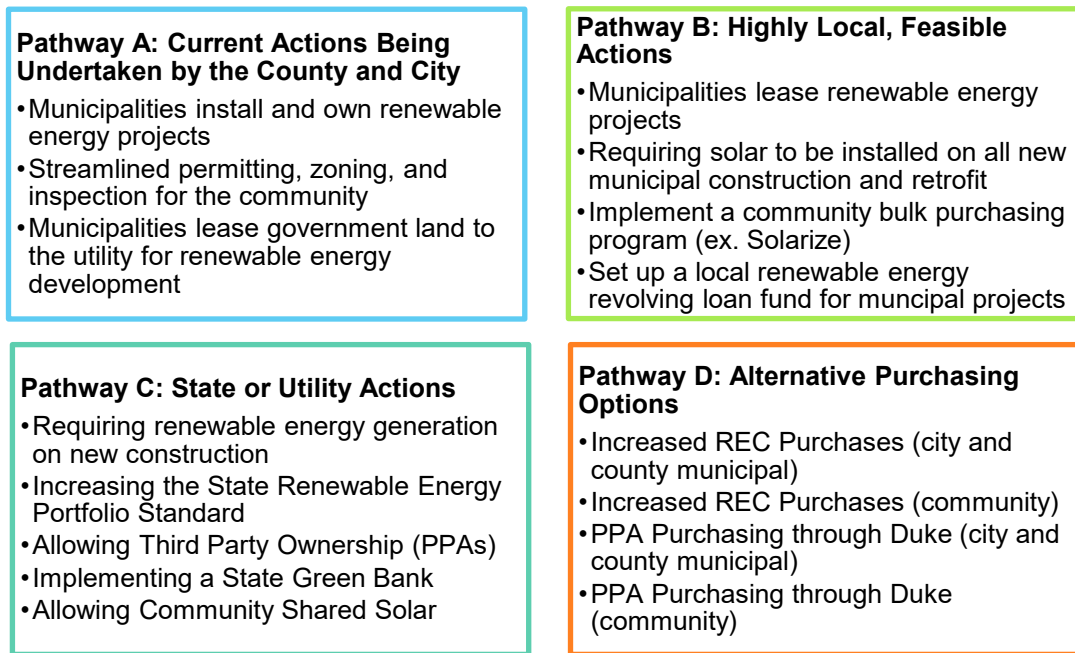
Figure 7: Criteria for Assessing Potential Renewable Energy Actions

Scale	<ul style="list-style-type: none"> • Identifies the potential for the action to increase the level of Renewable Energy in the County-Wide / Community energy mix
Financial Impacts	<ul style="list-style-type: none"> • Represents the overall costs the County or City will incur to implement the strategy
Feasibility	<ul style="list-style-type: none"> • Indicates how achievable the action is considering burden on municipal staff, policy barriers, political and technical barriers
Distributional Equity	<ul style="list-style-type: none"> • Refers to distributional effects of the benefits and unintended consequences to low-income communities associated with the action, including impacts of renewable energy availability, cost savings, local public health, and workforce development
Environmental Impact	<ul style="list-style-type: none"> • Refers to the environmental benefits and harms associated with the action including impacts on resiliency, land use, emissions, and conservation.
Local Impact	<ul style="list-style-type: none"> • Illustrates whether the action will have a positive local impact, increase renewable energy generation within the County/City limits, or the ability of the action to improve the County/City's position as a leader for renewable energy in NC.

Of the initial list of potential actions, 22 policies were qualitatively assessed using the criteria detailed above.⁵³ Based on the results of this policy analysis, policies were divided into Pathways based on which entity has the power to enact the policy (i.e., County or City, State, Utility, or other), and the feasibility, impact, cost, and other benefits. The Pathways determined as a result of the analysis are summarized in **Figure 8**, below, and detailed in **Appendix A**. In addition to the 14 policies in the Pathways which were modeled using for their potential impacts on the energy consumption mix (five of which are state-level changes), several additional strategies were identified as being better suited for implementation by other community members. These strategies might be suitable for organizations or collaborations such as the EITF, or are distinguished as actions that build capacity but have limited direct impacts on progress toward the renewable energy goals.

⁵³ For details on the qualitative policy analysis, please see **Appendix A**.

Figure 8: Pathways of Action



Considerations when Selecting Pathways of Action

There is a trade-off between the potential impact a policy or program will have on the County or City’s energy mix and the amount of control or influence the municipalities have over implementing the policy. Because North Carolina is a regulated state, the energy policies that impact IOUs like DEP are concentrated at the state level, rather than locally. Within this framework, DEP customers do not have the ability to choose a third-party electricity supplier. Therefore, many policies that could significantly affect the electricity supply in Buncombe County are directly related to changing DEP’s electricity generation assets, and are beyond the direct control of the County and City.

Dramatic changes to the electricity supply mix would require either collaboration with local utilities or action by state-level policy makers. In contrast, policies that the County and City have direct control over, such as installing renewable generation on municipally owned buildings, would drive growth in distributed generation markets but are not expected to cause broad changes in utility-scale power mixes.

Capacity-Building Actions

Stakeholders noted a strong need for renewable energy education throughout the community to help develop and support the local renewable energy market and make goals achievable. These strategies were not modeled in terms of energy impact; however, they remain important actions that will be pursued by the City, County, with support from the broader community.

- **Education.** Buncombe County and the City of Asheville should continue to educate and support the community by providing resources, trainings, workshops on renewable energy. This is likely to create support and buy-in for the county and city’s renewable energy efforts throughout the community.
- **Local workforce training.** Buncombe County and the City of Asheville can continue to support local renewable energy development by supporting vocational efforts for renewable energy. Investment in local workforce training is way to ensure there are local benefits from renewable energy, boost the economy, and support opportunity equity.

Collaborative Community Actions

In addition to the strategies modeled in the Pathways, there were several actions not prioritized by the County or the City at this time, or that require further research and due diligence. Additionally, some of these strategies require utility/municipality collaboration. These actions are noted as potential actions to be explored by the EITF in the near future to understand the viability of these strategies within Buncombe County. These potential actions include:

- Increasing local non-financial incentive programs, such as density bonuses for renewable energy installations on new construction;
- Development of a Community Land Trust;
- Creation of utility-owned or on-bill-financed rooftop solar programs (requires utility collaboration); Continued engagement of the utility in achieving energy goals by building government-utility relationships.

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Potential Pathways

Pathway A: Current Actions Undertaken by the City and County

Overview

Pathway A includes actions that are currently in progress or are being explored by the City of Asheville or Buncombe County. These actions are highly local, tend to have positive environmental impacts, and are within the City and County’s direct control. As noted above, these policies were evaluated to understand their potential impacts locally, costs to the City or County for implementation, as well as renewable energy impacts. The following section describes the evaluation of these actions in more depth (please see **Table 3** for a snapshot of the evaluative criteria, and **Overall Renewable Energy Impacts of Pathway A** for expected energy impacts).

Table 3: Pathway A Policy Review Summary

Strategy	Primary Applicable Targets	Potential Scale of Impact for County-Wide Goals	Potential Financial Impact	Potential Feasibility	Potential Equity Impacts	Potential Environmental Impacts	Potential Local Impacts
A.1. Onsite generation, locally owned	Municipal	Low	Medium	Medium	Neutral	Positive	High
A.2. Reduce permitting, zoning, inspection barriers for renewable energy	Community	Low-Medium	Low	Medium	Neutral	Positive	High
A.3. Lease County/City property for renewable energy development	Community	Low	Low	High	Positive	Positive	High

For the full policy analysis, please see **Appendix A**.

Evaluation of Actions

This section outlines the policies included, as well as their expected impacts on the City and County renewable energy goals. It is expected that the City and County could directly implement these actions simultaneously. All energy generation assumptions are included in **Appendix B**.

A.1. The City and County directly purchase, install, and own renewable energy projects for all existing municipal buildings.

Under this action, the City and County would procure renewable energy installations for all municipal facilities and property. The City and County would directly own these installations. With this opportunity, the County and City would generate their own renewable energy and reduce the amount of electricity that must be purchased from Duke Energy Progress. This option would provide the City and County with RECs, which could be kept by the City and County and count towards their renewable energy goals, or could be sold and used to generate revenue. For more information on RECs, see policy description D.1.

This option is considered highly local because it directly increases the amount of renewable energy in Buncombe County and demonstrates continued leadership of the local governments. This option would also have positive environment impacts because it contributes to improving air quality by reducing emissions associated with burning coal and oil.

Direct ownership requires some significant up-front costs but can lead to long-term cost-savings through avoided energy charges. The amount of installed renewable energy is limited to the available space throughout municipally-owned property. The payback on initial investments will vary depending on the design, and generation of each system. This strategy only impacts municipal buildings and loads.

Box 7: Timeline for Interconnecting Renewable Energy Projects

Interconnection is the process by which a new distributed energy generation resource such as a solar, wind or hydropower system, is connected to the utility's grid. Once a project has been built, it can be interconnected in order to provide power to the grid, and to enable net metering. Net metering is a billing mechanism for customers who generate their own electricity through distributed generation to get paid for any excess electricity that they produce. The interconnection process requires approval from the utility, which can be a lengthy process, depending on whether any grid improvements are needed to support the additional load, or the number of additional applications that are in the queue. The approximate length of time for interconnection according to the Duke Energy Interconnection Queue⁵⁴ for the City of Asheville and Buncombe County is one to ten years for projects over 20 kW in size. Projects under 20 kW are fast tracked and do not require a study, therefore they are not entered into the queue. The length of time required for interconnection is dependent on all preceding requests for interconnection being resolved, the volume and complexity of which varies between reporting periods.⁵⁵ The current queue for interconnection may pose some traction problems for local renewable energy projects. In the future, this would hopefully change to allow renewable energy projects to develop more quickly.

- The City has currently identified about 400,000 square feet in rooftop space available for solar development. This number includes rooftops that require additional construction prior to solar development, including maintenance, structural integrity, and re-roofing. This analysis estimates that if fully developed, the City's municipal rooftop space could provide about 4.5 MW of solar capacity at an upfront capital cost of \$12.8 million. It is important to note, however, that the City currently has identified additional costs in deferred maintenance associated with the necessary construction updates required to install solar.

The City of Asheville has already started to make progress towards this action with the purchase of a solar energy system for the Asheville Redefines Transit Station. Although payback periods are all unique to the individual project, solar projects in the greater Asheville area are estimated to pay back a return on investment between 11 and 16 years. Because this cost estimate does not factor

⁵⁴ Duke's Interconnection Queue is available here: <https://www.duke-energy.com/home/products/renewable-energy/generate-your-own/interconnection-queue>

⁵⁵ Duke Energy. (2018). Frequently Asked Questions: Large Distribution Connections (≥20kW). Retrieved from https://www.duke-energy.com/_media/pdfs/for-your-business/generate-your-own-renewable/interconnection-frequently-asked-questions-distribution.pdf?la=en

in the maintenance costs required to support solar, the City may face challenges funding these projects due to the high upfront cost and allocating budget for other City priorities.

- It is estimated that the County currently has about 85 municipal buildings with rooftops available for solar development. This analysis estimates that if fully developed, the County's municipal rooftop space could provide about 960 kW of solar capacity at an upfront cost of \$2.7 million. Although payback periods are all unique to the individual project, solar projects in the greater Asheville area are estimated to pay back within 11 and 16 years.^{56,57} Because this cost estimate does not factor in the maintenance costs required to support solar, the County may face challenges funding these projects due to the high upfront cost and allocating budget for other County priorities.

A.2. The City and County streamline solar permitting, inspections, and clarify zoning for renewable energy systems.

This action includes reducing barriers in local renewable energy permitting processes such as permitting review times and providing more transparency on application processes. By creating transparency, reducing overhead related to permitting and inspection, and clarifying zoning, the City and County can work to reduce non-hardware costs for solar developers and residents.

The City of Asheville has already taken steps to streamline its permitting process and clarify processes for local renewable energy development. In 2018, the Asheville achieved its SolSmart Gold designation, indicating that the municipal government had streamlined its permitting processes for small solar PV systems, allowed accessory solar by-right in all zoning districts, and created a permitting checklist. Continuing to streamline processes across communities throughout the community could help reduce soft costs related to installing local renewable energy systems.

- To take these actions, it is expected that the City and County would incur relatively low costs. Based on staff time associated with implementing similar processes in other communities, it is expected the City would need to fund staff time to pursue these actions (estimated at around \$3,000 in costs).
- The greater Buncombe community can expect an additional 46 MWh per year of from solar generation if all permitting cost reductions and increases in demand are implemented to the fullest potential. For assumptions around this estimation, please see **Appendix B**.

A.3. The City and County lease vacant public land to the utility for solar development

This option would allow the City and County to lease feasible vacant public land to DEP for renewable energy development. Under this arrangement, DEP would provide the municipalities with lease payments for the use of sites for renewable energy development. Electricity generated from leased land would feed directly to the grid, contributing to DEP's overall energy mix. This would ultimately contribute to the County's, City's, and community's energy mix through the purchase of electricity through the utility.

This option allows for the **development of more renewable energy generation locally** but is considered to have limited impacts on the overall energy mix as it will not directly offset any of the municipality's current usage. Rather, it would impact the utility's overall electricity supply mix. Leasing

⁵⁶ EnergySage. (n.d.). Retrieved July 16, 2019, from <https://www.energysage.com/solar-panels/solar-panel-cost/nc/buncombe-county/asheville/>

⁵⁷ Solar Panels in Asheville, NC: Solar Companies, Cost, and Installation. (n.d.). Retrieved July 16, 2019, from <https://decisiondata.org/solar-by-city/asheville-nc/>

has a low upfront and ongoing costs for the City and County, since the municipalities would not be purchasing or maintaining the solar equipment. Additionally, this option provides the City and County with an **additional revenue source** because DEP would pay the City and County **land lease payments** over time.

- For the City, this analysis assumes that a portion of the vacant public land owned by Asheville is available for solar development, due to limitations around interconnection, flood plains, shading, and tree protection (for more information on assumptions, please see **Appendix B**).” It is important to note that this available land is comprised of many separate parcels and is not available as one large, single-use asset. These properties were not individually reviewed to confirm parcel size and/or previously established City priorities. It is estimated that approximately 5.6 MW of solar may be installed on available publicly owned land, or 25 percent of what is needed to reach the municipal operations goal. However, because this energy production would first feed into the grid, the City would benefit from a percentage of this, as a ratio of its total load relative to that of DEP. Therefore, the City’s municipal operations would benefit from just 79 MWh annually from this policy, which is closer to about 0.3 percent of what is needed at the municipal operations level.
- For the County, this analysis assumes that a portion of the vacant public land owned by Buncombe County is available for solar development, due to limitations around interconnection, flood plains, shading, and tree protection (for more information on assumptions, please see **Appendix B**).” It is important to note that this available land is comprised of many separate parcels and is not available as one large, single-use asset. These properties were not individually reviewed to confirm parcel size and/or previously established County priorities. It is estimated that approximately 5.6 MW of solar may be installed on available publicly owned land, or 23 percent of what is needed to reach the County’s municipal operations goal. However, because this energy production would first feed into the grid, the County would benefit from a percentage of this, as a ratio of its total load relative to that of DEP. Therefore, the County’s municipal operations would benefit from just 85 MWh annually from this policy, which is closer to about 0.3 percent of what is needed at the municipal operations level.
- As stated in the two bullets above, a total of 11 MW of solar may be installed on publicly owned land, or about 0.5 percent of what is needed to reach the community’s goal. However, because this energy production would first feed into the grid, the community would benefit from a percentage of this, as a ratio of its total load relative to that of DEP. Therefore, the community would benefit from just 1,500 MWh annually from this policy, which is closer to about 0.2 percent of what is needed at the county-level.

Overall Renewable Energy Impacts of Pathway A

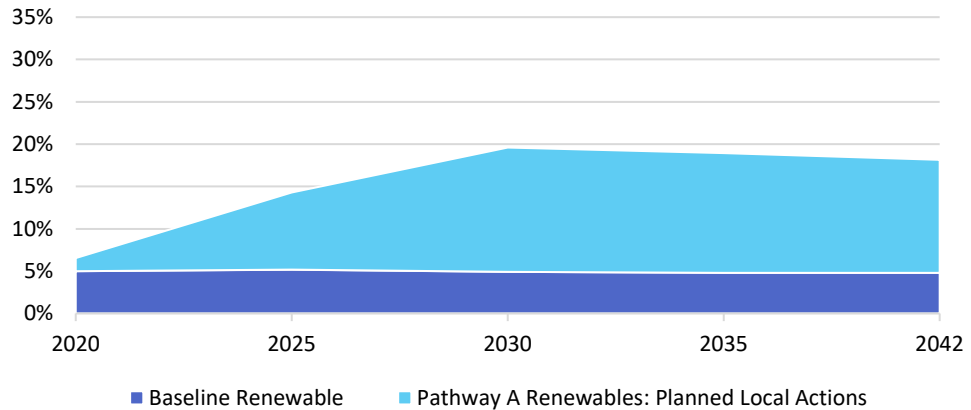
This analysis includes assumptions for each policy (outlined in **Appendix B**), including factors such as frequency of implementation, time-scale, and generation displacement based on examples from other cities, counties, and towns in the U.S. that have implemented similar policies. **Box 8** indicates the expected energy impacts of Pathway A.

Box 8: Pathway A - Overall Energy Impacts on Renewable Energy Goals



Under Pathway A, the City of Asheville could achieve almost 20 percent of its municipal renewable energy goal in facilities by providing an additional 4,200 MWh of renewable energy to city facilities (see **Figure 9**).

Figure 9: City of Asheville Municipal Energy Mix with Pathway A**

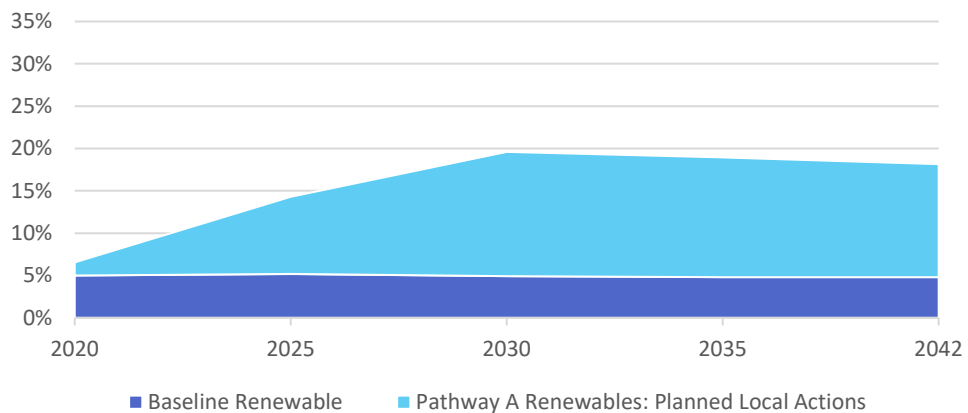


***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*



Under Pathway A, Buncombe County could achieve almost 20 percent of its municipal renewable energy goal in facilities by providing an additional 4,500 MWh of renewable energy to city facilities (see **Figure 10**).

Figure 10: Buncombe County Municipal Energy Mix with Pathway A**

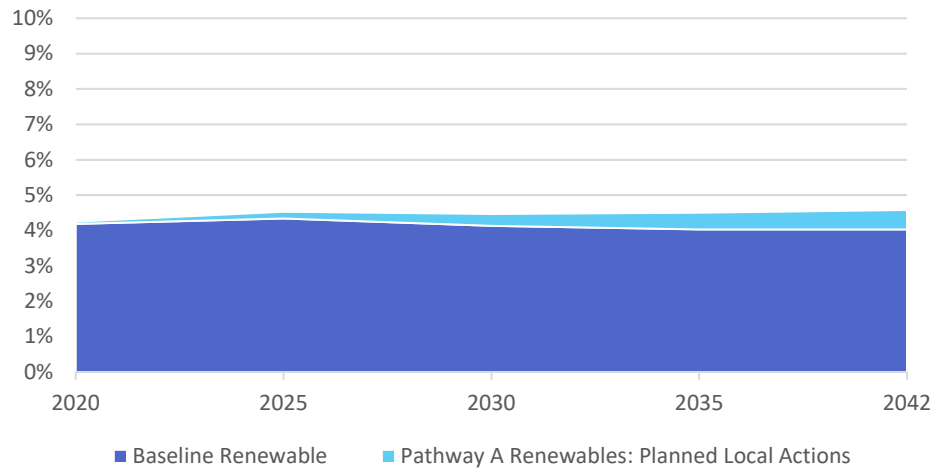


***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*



Under Pathway A, the community could achieve about 9 percent of its renewable energy goal in facilities by providing an additional 300,000 MWh of renewable energy to city facilities (see **Figure 11**).

Figure 11: Buncombe County Community-Wide Energy Mix with Pathway A**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

Box 9: Non-Energy Benefits of Pathway A

Renewable energy can bring additional benefits beyond more sustainable energy sources – including greenhouse gas emissions reduction in some cases, the creation of new clean energy jobs, and health benefits from cleaner air. According to the analysis, actions under Pathway A could result in an additional 40,166 MWhs of renewable energy annually. This amount of renewable energy is associated with:

- An estimated \$28,000-64,000 in total health benefits for Buncombe County;⁵⁸
- Approximately 300 tons of CO₂ and other harmful emissions kept out of North Carolina’s environment every month;⁵⁹ and
- A projected 156 cumulative full-time employees per year.⁶⁰

⁵⁸ CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. (2019, May 24). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool>

⁵⁹ AVOIDed Emissions and geneRation Tool (AVERT). (2019, May 22). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert>

⁶⁰ Jobs and Economic Development Impact (JEDI) Models: NREL. (n.d.). Retrieved July 15, 2019, from <https://www.nrel.gov/analysis/jedi/>

Pathway B: Highly Local, Feasible Actions

Overview

This pathway includes actions that are considered highly local and highly feasible for the City and County governments to implement. These actions are within the City and County’s direct control and are focused on both the municipal and community-wide goals. The following section describes the evaluation of these actions in more depth (please see **Table 4** for a snapshot of the evaluative criteria).

Table 4: Policy Review of Pathway B for the City Municipal Operations

Strategy	Primary Applicable Targets	Potential Scale of Impact for County-Wide Goals	Potential Financial Impact	Potential Feasibility	Potential Equity Impacts	Potential Environmental Impacts	Potential Local Impacts
B.1. County or City enter into solar leases with utility for renewable energy	Community	Low	Low	Medium-High	Positive	Positive	High
B.2. County or City require solar to be installed on all new municipal construction and retrofit	Municipal	Low	Medium	Medium	Positive	Positive	High
B.3. County or City support community bulk purchasing program (e.g. Solarize)	Community	Low-Medium	Low	High	Neutral	Positive	High
B.4. Establish a revolving investment fund for municipal renewable energy projects	Municipal	Low-Medium	High	Medium	Positive	Neutral	High

For the full policy analysis, please see **Appendix A**.

Evaluation of Actions

This section outlines the policies included, as well as their expected impacts on the City and County renewable energy goals. All energy generation assumptions are included in **Appendix B**.

B.1. The City and County enter into solar leases with the utility

For this action, the City and County would procure solar energy for municipal sites under a solar lease agreement. In contrast to directly owning and purchasing the system, under a solar lease agreement the City or County would pay a fixed monthly rate to Duke Energy Progress for the electricity generated from the project. DEP would own and maintain the system, while the City or County would be allowed to use all electricity generated from the panels for a fixed monthly cost.

These agreements have low to no up-front cost, apart from the staff time needed to procure and negotiate the solar lease. This makes them highly feasible with lower financial impacts to the City. This

option could increase the rate at which local renewable energy projects are built as they are less dependent on capital funding. This analysis does not assume that both solar leasing and direct ownership (action A.1) would happen at the same time, in order to prevent overlapping assumptions around total available rooftop space. Under lease agreements, solar generation is intended to displace some electricity from the utility, allowing for potential savings between utility costs and lease prices.

- This policy assumption estimates that leasing would cost the City of Asheville about \$7.81/kW per month.⁶¹ Assuming all available feasible rooftop space on City-owned buildings is utilized for solar leasing, this would accumulate to about 6,000 MWh annually, which would cost about \$420,000/year. This option, if fully implemented, could get the City to about 20 percent of its overall goal of 100 percent renewable energy by 2030.
- This analysis estimates that leasing would cost the County about \$7.81/kW per month.⁶² Assuming all available feasible rooftop space on City-owned buildings is utilized for solar leasing, this would accumulate to about 1,300 MWh annually, which would cost about \$90,000/year. However, it is important to note that this cost would displace the cost of electricity to the utility, so it is still considered to be financially feasible. This option, if fully implemented, could get the County to about 15 percent of its overall goal of 100 percent renewable energy by 2030.

Box 10: Direct Ownership vs. Solar Leasing

In North Carolina, there are two ways in which residents, businesses, and municipalities can develop solar on-site in North Carolina. The first is a direct ownership of a solar energy system on a property. The second is through leasing a solar energy system to be installed on a property through fixed, monthly payments to the developer.

Solar leasing usually involves a few benefits, such as little- to no-upfront capital costs, or ongoing operations and maintenance costs to the leaseholder. However, solar leasing is typically understood to result in fewer cost savings than ownership over the lifetime of the system, and leaseholders do not typically receive the environmental attributes of the system (e.g. RECs that are generated. For more information on RECs, see policy description D.1.).

For more information on the difference between these, please visit:

<https://www.energysage.com/solar/financing/solar-leases-and-solar-ppas/>

B.2. Require solar to be installed on all new municipal construction and major retrofits.

This option, if pursued, would require solar panels to be installed where feasible⁶³ on all new rooftops during new construction and during major retrofits of municipal facilities. This is similar to solar mandates across the United States which require a level of solar-readiness of new construction or the installation of solar panels. This policy option would increase the amount of local distributed generation and is seen as environmentally beneficial, as it displaces electricity consumption from nuclear and fossil fuel technologies. This option would create additional capital costs during the time of retrofit or new construction.

⁶¹ This cost is based on the average electricity price in Buncombe County. To be viable, this analysis estimated that these costs would be on par with local electricity rates for consumers. Actual lease rates will vary from project to project.

⁶² Ibid.

⁶³ Feasibility will likely depend on shading and solar potential at each site.

- Assuming that one new City building and one major retrofit occurs every four years, the City can expect to add a total of 84 MWh of new renewable energy by 2030. This meets 0.3 percent of the municipality's total renewable energy needs. It is estimated that this would cost the City about \$70,500 in upfront capital costs every four years.
- Assuming that one new County building and one major retrofit occurs every four years, the County can expect to add a total of 84 MWh of new renewable energy by 2030. This meets 0.3 percent of the municipality's total renewable energy needs. It is estimated that this would cost the County about \$70,500 in upfront capital costs every four years.

B.3. Implement a community bulk purchasing program (e.g. Solarize)

The County and City can support a local solarize-style campaign to help deploy more renewable energy locally. Solarize campaigns are bulk purchasing programs that typically run 3-9 months. The program aggregates demand from a number of residents or commercial entities so developers offer competitive or discounted rates for the solar energy systems and other technologies based on the number of installations. Solarize campaigns are often run by local community groups or nonprofits with support of a local government. Marketing and lead generation, along with the short-term offer of lower costs all lend themselves to the overall success of the program.

The City of Asheville has previously conducted a Solarize campaign, which resulted in 1,200 leads, and 100 contracts being signed for local solar installations. This action encourages more local renewable energy generation throughout the community and can also help the community begin to make immediate progress towards the County-wide 2042 goal.

While the equity impacts are overall considered neutral, Solarize campaigns often do include an element of community education which may be beneficial for all citizens. Additionally, some solar developers may offer options for low-income renters such as community shared solar subscriptions, or energy efficiency audits for households that may not qualify for solar.

- The costs to the City for supporting Solarize campaigns is expected to be minimal as it is often a community-run program. However, if the City were to contribute to the annual full-time employment of a staff member to support this program, it is estimated that the City would support this with about \$8,800 annually, based on population.
- The costs to the County for supporting Solarize campaigns is expected to be minimal as it is often a community-run program. However, if the City were to contribute to the annual full-time employment of a staff member to support this program, it is estimated that the City would support this with about \$16,000 annually, based on population.
- The community is expected to benefit by about 680 MWh every three years from this type of campaign, which meets about 0.2 percent of its overall needs.

B.4. Establish an internal revolving investment fund for renewable energy projects at municipal sites.

This option includes establishing and continuing a County-level internal revolving investment program for municipal facilities to fund renewable energy and energy efficiency projects. The fund is established via an initial capitalization, with a certain percentage of funding being lent out each year for new clean energy projects. It is expected that investments in these projects will create economic savings associated with lower utility bills. These long-term savings are then used to replenish the fund for future rounds of clean energy infrastructure investments.

This option would allow more direct ownership and local project development on municipal sites. It represents an alternative financing mechanism that the County or City could use to purchase

renewable energy projects. The local fund assumed an initial capitalization of \$350,000, which was an amount provided by Buncombe County, and an average project tenor of 20 years.

- The County’s municipal operations can expect an increase in about 285 MWh of renewable energy annually from this policy by 2030, or about 0.9 percent of its total renewable energy needs.
- Because this internal revolving investment program would only benefit Buncombe County municipal operations, it is not expected that the greater Buncombe County Community would benefit from this policy option.

Box 11: Aggregated Solar Procurement

While not modeled, one mechanism by which the County or City could deploy more renewable energy across the community is through an aggregated procurement for larger energy purchasers. This would require the County or City to coordinate with additional entities in the communities such as commercial and industrial businesses to procure solar for multiple entities at once. This would entail the local government collaborating with entities within the community to identify potential opportunities, viable sites, and demand, and issuing an RFP for the procurement and installation of solar at these sites. By aggregating the procurement, the installation price might be more competitive. This action is considered highly local as it is encouraging the development of renewable energy systems within the community in addition to the City or County sites.

Overall Renewable Energy Impacts of Pathway B

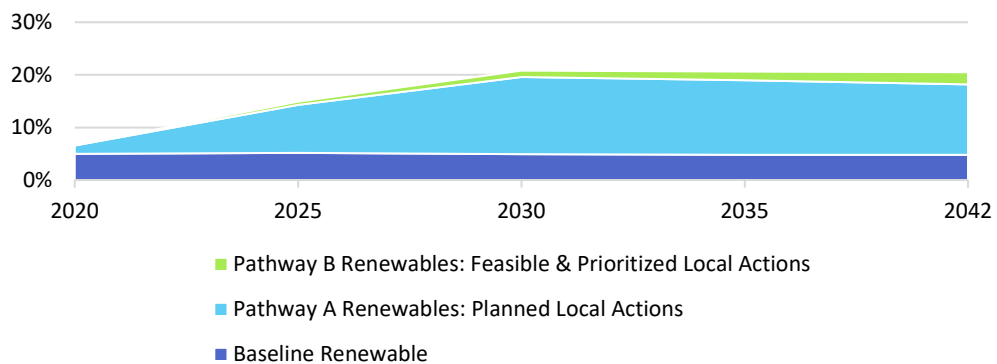
This analysis includes assumptions for each policy (outlined in **Appendix B**), including factors such as frequency of implementation, time-scale, and generation displacement based on examples from other cities, counties, and towns in the U.S. that have implemented similar policies, as well as expertise. **Box 12** outlines the potential energy impacts if each of the policies in Pathway B were implemented to their fullest extent.

Box 12: Pathway B - Overall Energy Impacts on Renewable Energy Goals



Under Pathway B, the City of Asheville could achieve an overall increase of 8 MWh of renewable energy in its municipal energy mix by 2030, which is less than 1 percent of its overall renewable energy needs in 2030. (see **Figure 12**).

Figure 12: City of Asheville Municipal Renewable Energy with Pathways A and B**

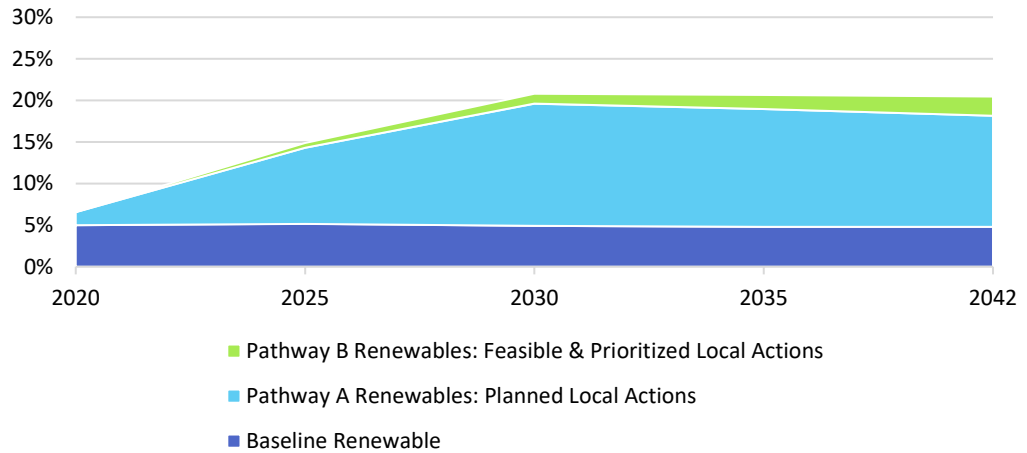


***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*



Under Pathway B, Buncombe County could achieve an increase of 370 MWh of renewable energy in its municipal energy mix by 2030, which is about 1 percent of its overall renewable energy needs by 2030 (see **Figure 13**).

Figure 13: Buncombe County Municipal Renewable Energy with Pathways A and B**

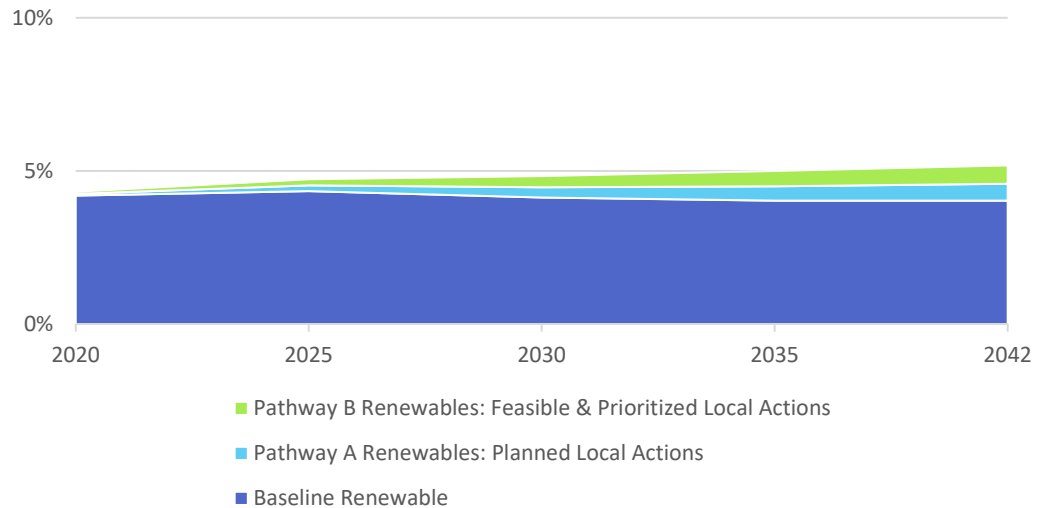


***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*



Under Pathway B, the community could achieve an increase of renewable energy in the county-wide energy mix of about one percent by 2042, or about 20,000 MWh (see **Figure 14**).

Figure 14: Buncombe County Community-Wide Energy Mix with Pathways A and B**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

Box 13: Non-Energy Benefits of Pathway B

Renewable energy can bring additional benefits beyond more sustainable energy sources – including greenhouse gas emissions reduction in some cases, the creation of new clean energy jobs, and health benefits from cleaner air. According to the analysis, actions under Pathway B could result in an additional 43,458 MWhs of renewable energy annually. This amount of renewable energy is associated with:

This amount of renewable energy can provide a number of co-benefits to community members, including:

- An estimated \$30,000-70,000 in total health benefits;⁶⁴
- Approximately 350 tons of CO₂ and other harmful emissions kept out of North Carolina’s environment every month⁶⁵; and
- A projected \$7.9 million in additional total income earnings in the state from on-site labor and local revenue and supply chain impacts.⁶⁶

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⁶⁴ CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. (2019, May 24). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool>

⁶⁵ AVOIDed Emissions and geneRation Tool (AVERT). (2019, May 22). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert>

⁶⁶ Jobs and Economic Development Impact (JEDI) Models: NREL. (n.d.). Retrieved July 15, 2019, from <https://www.nrel.gov/analysis/jedi/>

Pathway C: State Level Actions

Overview

This pathway examines how changes to state policy or changes by the utilities serving Buncombe County may impact the progress towards renewable energy goals locally. As noted in the State Regulatory Context section, North Carolina has several policies in place that could be expanded, or new ones which could be enacted to help support Buncombe County’s and the City of Asheville’s renewable energy goals. This analysis incorporates feedback from stakeholders to identify potential policy and programmatic changes which could happen in the near term. Although the City and County do not have direct control over these policy changes or programs, they can continue to engage in these discussions and support the policies that may help them accomplish important and comprehensive change.

Table 5: Policy Review of Pathway C for the City Municipal Operations

Strategy	Primary Applicable Targets	Potential Scale of Impact for County-Wide Goals	Potential Financial Impact	Potential Feasibility	Potential Equity Impacts	Potential Environmental Impacts	Potential Local Impacts
C.1. State-wide mandate requiring renewable energy generation on new construction	Community and Municipal	Medium	Medium	Low	Neutral to Negative	Positive	Medium
C.2. Increasing the State Renewable Energy Portfolio Standard	Community and Municipal	High	Low	Low	Neutral	Positive	Medium
C.3. Allowing Third-Party Ownership (Power Purchase Agreements)	Community and Municipal	Low-Medium	Low	Medium	Neutral to Positive	Positive to Neutral	Medium
C.4. Implementing a State Green Bank	Community	Low	Low-Medium	Medium	Neutral to Positive	Neutral to Positive	Medium
C.5. Enabling Community Shared Solar	Community and Municipal	Low	Low	Low-Medium	Positive	Positive	High

For the full policy analysis, please see **Appendix A**.

Evaluation of Actions

This section outlines the policies included in Pathway C, as well as their expected impacts on the City and County renewable energy goals. All energy generation assumptions are included in **Appendix B**.

C.1. A state-wide mandate requiring solar installation on all new construction.

Under this scenario, the City and County would support the creation of a statewide regulation requiring renewable energy to be installed on all capital improvement projects or new construction. Depending on the pace at which capital improvement projects or new construction occurs, this policy

is aimed at offsetting growth and curbing increased energy consumption. This would likely present some higher up-front costs to developers and organizations that need to make improvements.

- Based on the expected building growth throughout the City, this analysis expects an additional 3,000 MWh of solar power to be added to the City's portfolio by 2030. This would meet about 15 percent of the City's renewable energy needs in 2030. Assuming a direct purchase for all solar panels, this would cost the City around \$6.4 million.
- Based on the expected building growth throughout the County, this analysis expects an additional 3,200 MWh of solar power to be added to the County's portfolio by 2030. This would meet about 15 percent of the County's renewable energy needs in 2030. Assuming a direct purchase for all solar panels, this would cost the County around \$6.8 million.
- Based on the expected building growth throughout the County, this analysis expects an additional 1,500,000 MWh of solar power to be added to the community's portfolio by 2042. This would meet about 25 percent of the community's renewable energy needs in 2042.

C.2. Increasing the State Renewable Energy Portfolio Standard.

North Carolina currently requires investor-owned utilities to supply 12.5 percent of their retail sales in the state from renewable energy sources or energy efficiency by 2021. Today, up to 25 percent of this requirement may be met through energy efficiency technologies, including combined heat and power systems powered by non-renewable fuels, increasing to 40% in 2021.⁶⁷

By increasing the amount of renewables required under the renewable energy portfolio standard, all electric utilities in the state, including DEP, would be required to adhere to an increase in their renewable generation mix within a certain time frame. Many states have more ambitious goals, such as New Jersey's RPS of 50 percent by 2030,⁶⁸ and California's RPS of 60 percent by 2030.⁶⁹ Because most state RPS policies are separate from State energy efficiency standards, the following analyses only assume an impact on renewable energy. If North Carolina were to pass a goal similar to that of New Jersey, it could provide the following impacts.

- Provide an additional 7,300 MWh of renewable energy annually by 2030 to the City of Asheville. This could help the City reach up to 24 percent of its overall goal for 100 percent renewable energy. If the State were to increase the REPS independent of any City-level actions, the costs to the City of the policy change are expected to be minimal. However, if the City dedicated staff time to support this state-level policy change, it is estimated to cost the City about \$3,800 annually.⁷⁰ The City could also engage in regional networks of municipalities to achieve a variety of renewable energy policy outcomes. Annual membership dues for such an organization can range from \$700 to \$7,000, depending on the city's population size.⁷¹

⁶⁷ DSIRE. (n.d.). Retrieved July 16, 2019, from <https://programs.dsireusa.org/system/program/detail/2660>

⁶⁸ New Jersey's RPS law requires utilities to source 50% of their electricity supply using renewable energy sources. <https://pv-magazine-usa.com/2018/05/23/new-jersey-joins-the-50-by-2030-renewable-energy-club/>

⁶⁹ California's RPS is 60% renewable electricity supply by 2030. https://www.cpuc.ca.gov/RPS_Overview/

⁷⁰ As a proxy for the cost of a City employee's time to support this effort, this figure is on a lobbyist's salary. This assumes that this task would require 10 percent of a lobbyist's time for both the City and County, divided between the two based on respective population sizes.

⁷¹ These figures are based on Cadmus' internal review of membership fees for regional energy policy groups.

- Provide an additional 7,800 MWh of renewable energy annually by 2030 to Buncombe County. This could help the County reach up to 24 percent of its overall goal for 100 percent renewable energy. If the State were to increase the REPS independent of any County-level actions, the costs to the County of the policy change are expected to be minimal. However, if the County dedicated staff time to this state-level policy change, it is estimated to cost about \$6,900 annually.⁷² Additionally, the County could engage in regional networks of municipalities to achieve a variety of renewable energy policy outcomes. Annual membership dues for such an organization can range from \$700 to \$7,000, depending on the city's population size.⁷³
- Provide an additional 1.5 million MWh of renewable energy annually by 2042 to the Buncombe community. This could help the community reach up to 22 percent of its overall goal for 100 percent renewable energy.

C.3. Allowing Third-Party Ownership of Solar via Power Purchase Agreements.

Power Purchase Agreements (PPAs) allow entities to purchase energy from solar projects not directly owned by the utility. North Carolina currently does not allow third-party power purchase agreements,⁷⁴ however, if they were to be allowed, the City could sign a long-term PPA contract with a solar developer to install solar panels on their property and purchase the renewable energy produced by these panels at a \$/kWh rate agreed upon by both parties. This would allow third party developers to enter the market as energy suppliers and provide solar power to property owners through PPAs with no-upfront costs.

If enacted, this policy would impact the municipal goals by providing more options for the purchase of renewable energy. Often, PPAs can result in a more competitive price for electricity because federal tax credits for solar, which cannot be monetized directly by the municipality, but can be monetized by the developer who then passes on those savings to the buyer (in this case, the City or County).⁷⁵ Additionally, PPAs do not require an up-front capital cost, which may provide more flexible payment options.

- It is estimated that the City would benefit from an additional 59 MWh annually from increased demand through solar PPAs. This would get the City to about 5 percent of its overall goal by 2030. If the State were to enact a policy that allows PPAs independent of any City-level actions, the costs to the City of the policy change are expected to be minimal. However, if the City dedicated staff time to this state-level policy change, it is estimated to cost the City about \$3,800 annually.⁷⁶ The City could also engage in regional networks of cities to achieve a variety of renewable energy

⁷² As a proxy for the cost of a County employee's time to support this effort, this figure is on a lobbyist's salary. This assumes that this task would require 10 percent of a lobbyist's time for both the City and County, divided between the two based on respective population sizes.

⁷³ These figures are based on Cadmus' internal review of membership fees for regional energy policy groups.

⁷⁴ Please refer to Footnote 12 for more detail.

⁷⁵ The federal solar ITC applies to solar systems on residential and commercial systems, not municipal systems. For more information, please see <https://www.seia.org/initiatives/solar-investment-tax-credit-itc>.

⁷⁶ As a proxy for the cost of a City employee's time to support this effort, this figure is on a lobbyist's salary. This assumes that this task would require 10 percent of a lobbyist's time for both the City and County, divided between the two based on respective population sizes.

policy outcomes. Annual membership dues for such an organization can range from \$700 to \$7,000, depending on the city's population size.⁷⁷

- It is estimated that the County would benefit from an additional 63 MWh annually from increased demand through solar PPAs. This would get the County to about 4.7 percent of its overall goal by 2030. If the State were to enact a policy that allows PPAs independent of any County-level actions, the costs to the County of the policy change are expected to be minimal. However, if the County dedicated staff time to this state-level policy change, it is estimated to cost about \$6,900 annually.⁷⁸ Additionally, the County could engage in regional networks of cities to achieve a variety of renewable energy policy outcomes. Annual membership dues for such an organization can range from \$700 to \$7,000, depending on the city's population size.⁷⁹
- It is estimated that the Buncombe County community would benefit from an additional 11,200 MWh annually from increased demand through solar PPAs. This would get the community to about 4.3 percent of its overall goal by 2030.

C.4. Implementing a State Green Bank

Green banks, also called clean energy funds, infrastructure banks or resiliency banks, are public, quasi-public, or non-profit entities formed specifically to funnel investments into targeted green technologies and infrastructure, such as renewable energy, energy efficiency, demand response, and storage markets.⁸⁰ This allows the organizing government body to forge innovative and creative partnerships between private and public finance while leveraging investment from the private sector.

If implemented at the state level, a green bank could help fund investments in local clean energy technology developments and further develop the renewable energy market in Buncombe County by providing incentives to residents and businesses.

Implementing a state green bank may require capitalization from the City and County, as well as other entities across the state. This analysis assumed an initial state-wide capitalization of about \$37,700,000, which is equal to the amount used to capitalize North Carolina's 1996 Clean Water Management Fund Trust.⁸¹

Under this scenario, it is estimated that the City and County might contribute funding to a State-wide public Green Bank. However, depending on the Green Bank's design, municipal contributes would not necessarily be required.

- Based on its proportion of the state population, the City would need to allocate about 0.89 percent of the bank's capitalization costs, amounting to about \$334,000. This analysis estimates that a state green bank of this size could contribute an additional 24 MWh of renewable energy to the City municipal operations each year via its investments, which would get the City to about 4.8 percent of its overall goal by 2030.

⁷⁷ These figures are based on Cadmus' internal review of membership fees for regional energy policy groups.

⁷⁸ As a proxy for the cost of a County employee's time to support this effort, this figure is on a lobbyist's salary. This assumes that this task would require 10 percent of a lobbyist's time for both the City and County, divided between the two based on respective population sizes.

⁷⁹ These figures are based on Cadmus' internal review of membership fees for regional energy policy groups.

⁸⁰ OECD, *Green Investment Banks: Scaling up Private Investment in Low-carbon, Climate resilient Infrastructure*, 2016, <https://doi.org/10.1787/9789264245129-en>.

⁸¹ EPA, 2017 Annual Report: Clean Water State Revolving Fund Programs, retrieved from https://www.epa.gov/sites/production/files/2018-03/documents/final_2017_cwsrf_annual_report_for_web2.pdf

- The County would cover about 1.6 percent of those costs, based on population, amounting to about \$607,000. This analysis estimates that a state green bank of this size could contribute an additional 26 MWh of renewable energy to the County municipal operations each year, which would get the County to about 4.6 percent of its overall goal by 2030.
- This analysis estimates that a state green bank of this size could contribute an additional 10,000 MWh of renewable energy to the Buncombe County community each year, which would get the community to about 4.3 percent of its overall goal by 2030.

C.5. Enabling Community Shared Solar

Community-shared solar allows for a third-party developer or a utility to build a commercial-scale solar energy system, sell “blocks” of it to subscribers, send the generated electricity to the grid, and off-set subscriber energy usage. Subscribers are not required to have the solar energy physically installed on their property; rather, it allows for renters, homeowners, and community participants the flexibility to purchase solar energy without requiring a viable site for solar at their home.

Due to the regulated nature of North Carolina’s electric utilities, community solar is a program that must be implemented at the state and utility level, rather than at the local level. A 2017 state law requires DEP to offer 20 MW of community solar to its NC customers, which would reimburse participants for energy generated by their portion of the community solar facility.⁸² The program is currently undergoing a formal docket process at the NCUC to determine the details of the program, and DEP anticipates implementing the program in 2020. This analysis assumes that the program will be implemented in 2020; that DEP will offer 20 MW of community solar to its customers; and that the Buncombe County community will sign up for a total of about 500 kW.

Once implemented at the state-level, this analysis estimates:

- Community solar could contribute an additional 3.5 MWh of renewable energy to the City municipal operations each year, which gets the City to about 4.7 percent of its overall goal by 2030. If the State were to enact additional policy changes to improve the community solar program independent of any City-level actions, the costs to the City of such policy changes are expected to be minimal. However, if the City were to dedicate staff time to improve or expand this policy, it is estimated to cost the City about \$3,800 annually.⁸³ The City could also engage in regional networks of cities to achieve a variety of renewable energy policy outcomes, including improvements to the community solar program. Annual membership dues for such an organization can range from \$700 to \$7,000, depending on the city’s population size.⁸⁴
- Community solar could contribute an additional 3.7 MWh of renewable energy to the County municipal operations each year, which gets the County to about 4.6 percent of its overall goal by 2030. If the State made improvements to this program without County support, the costs to the County for improving or expanding upon this state policy is expected to be minimal. However, if

⁸² General Assembly of North Carolina, Session 2017, House Bill 589, Competitive Energy Solutions for North Carolina, retrieved from <https://www.ncleg.net/Sessions/2017/Bills/House/PDF/H589v6.pdf>

⁸³ As a proxy for the cost of a City employee’s time to support this effort, this figure is on a lobbyist’s salary. This assumes that this task would require 10 percent of a lobbyist’s time for both the City and County, divided between the two based on respective population sizes. See Salary.com. (n.d.). Lobbyist Salary in Raleigh, NC. Retrieved from <https://www.salary.com/research/salary/benchmark/lobbyist-salary/raleigh-nc>

⁸⁴ These figures are based on Cadmus’ internal review of membership fees for regional energy policy groups.

the County dedicated staff time to improve or expand this policy, it is estimated to cost about \$6,900 annually.⁸⁵ The County could also engage in regional networks of cities to achieve a variety of renewable energy policy outcomes. Annual membership dues for such an organization can range from \$700 to \$7,000, depending on the County’s population size.⁸⁶

- Community solar could contribute an additional 671 MWh of renewable energy to the Buncombe County community each year, which gets the community to about 4.1 percent of its overall goal by 2042.

Overall Renewable Energy Impacts of Pathway C

This analysis includes assumptions for each policy (outlined in **Appendix B**), including factors such as frequency of implementation, time-scale, and generation displacement based on examples from other cities, counties, and towns in the U.S. that have implemented similar policies.

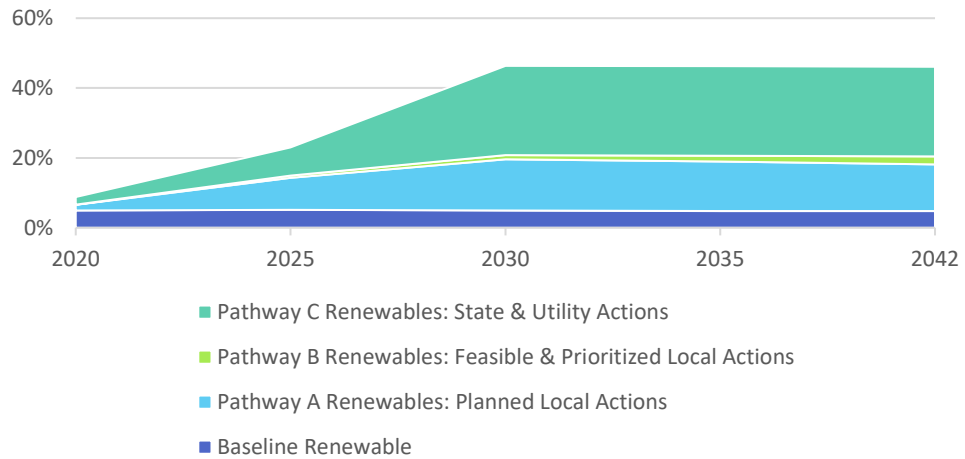
If each of the policies under Pathway C were enabled at the state level, this could have significant impacts on the City, County, and Community-wide goals. **Box 14** outlines the potential overall energy impacts if each action was enabled at the state level.

Box 14: Pathway C - Overall Energy Impacts on Renewable Energy Goals



Under Pathway C, these actions could contribute an additional 10,400 MWh of renewable energy to the City of Asheville by 2030. This amounts to about 34 percent of the total goal (see **Figure 15**).

Figure 15: City of Asheville Municipal Renewable Energy with Pathways A, B and C**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

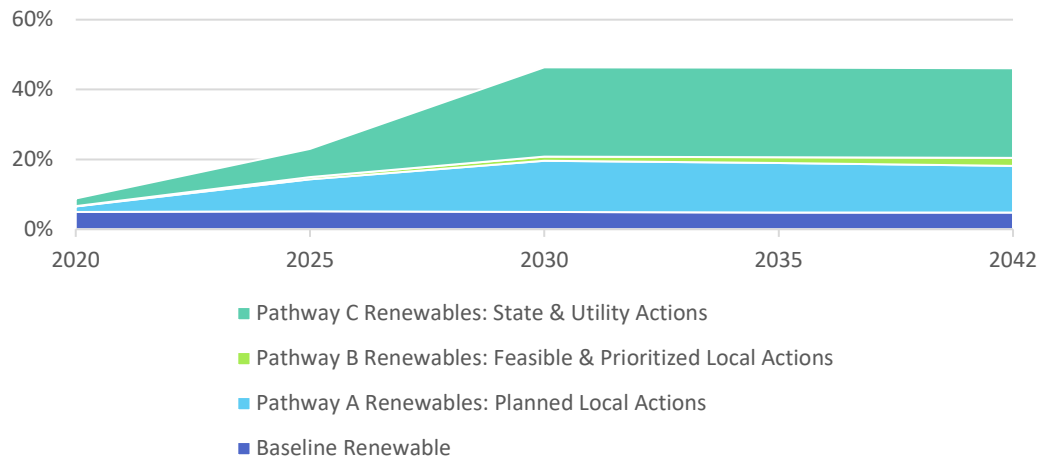
⁸⁵ As a proxy for the cost of a County employee’s time to support this effort, this figure is on a lobbyist’s salary. This assumes that this task would require 10 percent of a lobbyist’s time for both the City and County, divided between the two based on respective population sizes.

⁸⁶ These figures are based on Cadmus’ internal review of membership fees for regional energy policy groups.



Under Pathway C, Buncombe County could achieve an increase of renewable energy in its municipal energy mix of 11,000 MWh, or about 33 percent of the total goal (see **Figure 16**).

Figure 16: Buncombe County Municipal Renewable Energy with Pathways A, B and C**

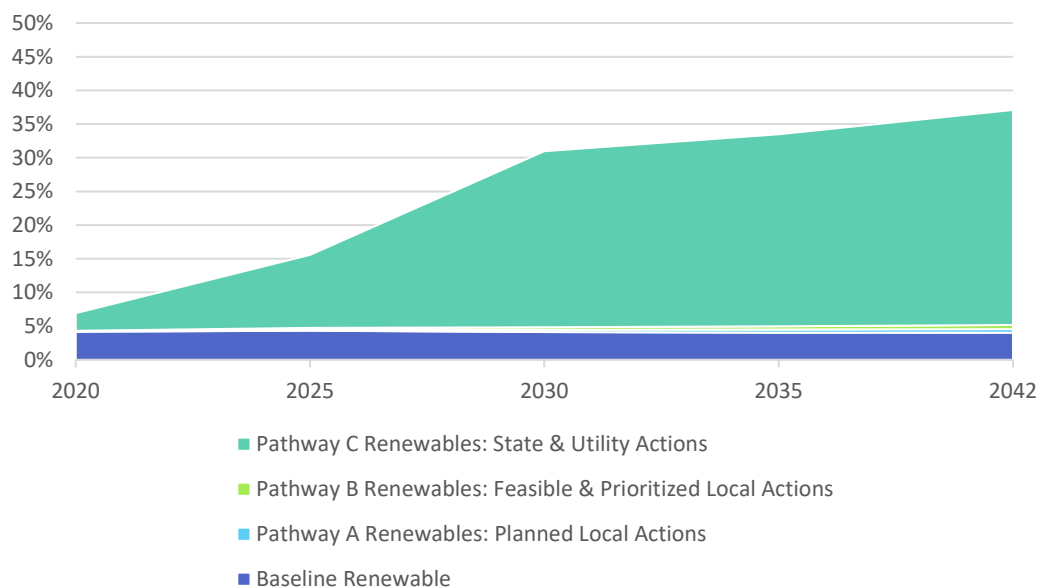


***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*



Under Pathway C, the community could achieve an increase of renewable energy in the county-wide energy mix of 3 million MWh by 2042, or about 42 percent of the total goal. (see **Figure 17**).

Figure 17: Buncombe County Community-Wide Energy Mix with Pathways A B, and C**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

Box 15: Non-Energy Benefits of Pathway C

Renewable energy can bring additional benefits beyond more sustainable energy sources – including greenhouse gas emissions reduction in some cases, the creation of new clean energy jobs, and health benefits from cleaner air. According to the analysis, actions under Pathway C could result in an additional 768,769 MWhs of renewable energy annually. While not all of this is considered local energy, this amount of renewable energy is associated with:

- An estimated \$528,000-1,200,000 in total health benefits for Buncombe County;⁸⁷
- Approximately 6,500 tons of CO₂ and other harmful emissions kept out of North Carolina’s environment every month⁸⁸; and
- A projected 2,444 full time employees per year.⁸⁹

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⁸⁷ CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. (2019, May 24). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool>

⁸⁸ AVOIDed Emissions and geneRation Tool (AVERT). (2019, May 22). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert>

⁸⁹ Jobs and Economic Development Impact (JEDI) Models: NREL. (n.d.). Retrieved July 15, 2019, from <https://www.nrel.gov/analysis/jedi/>

Pathway D: Alternative Purchasing Options

Overview

Many communities are constrained by the amount of space needed for renewable energy generation and the control they have over their energy supply. Outside of onsite generation, there are a few ways in which the County and the City can consider renewable energy purchasing. These types of actions include options to purchase green energy through the utility and a third party developer, or purchase renewable energy certificates (RECs). Stakeholders did not immediately prioritize these actions because they do not necessarily lead to locally developed and visible projects within Buncombe County (see **Table 6**), however, this Pathway does provide flexibility to the County, City, and community members for meeting renewable energy goals.

Table 6. Policy Review of Pathway D for the City, County, and Community Operations

Strategy	Primary Applicable Targets	Potential Scale of Impact for County-Wide Goals	Potential Financial Impact	Potential Feasibility	Potential Equity Impacts	Potential Environmental Impacts	Potential Local Impacts
D.1. The purchase of Renewable Energy Certificates (RECs) by the City or the County	Municipal	Medium	Medium-High	Medium-High	Negative	Neutral to Positive	Low
D.2. The purchase of Renewable Energy Certificates (RECs) by the residents and businesses	Community	High	Medium-High	Medium	Negative	Neutral to Positive	Low
D.3. Purchase of renewable energy through Duke Energy Progress	Community and Municipal	Low	Low	High	Neutral to Negative	Neutral to Positive	Medium

For the full policy analysis, please see **Appendix A**.

Evaluation of Actions

This section outlines the policies included in Pathway D, as well as their expected impacts on the City and County renewable energy goals. All energy generation assumptions are included in **Appendix B**.

D.1. The purchase of Renewable Energy Certificates by the City or County

Renewable Energy Certifications (RECs) represent the renewable energy attributes of generation from a renewable energy system. One certificate is typically equal to 1 MWh of renewable energy.⁹⁰ The REC market allows for the buying and selling of the RECs and can help municipalities meet renewable energy goals. Even if the City and County purchase RECs rather than generating RECs through on-site generation, ownership of the REC will contribute towards the County's and City's total amount of renewable energy produced and achievement of their 2030 goals.

⁹⁰ Renewable Energy Certificates (RECs). (2019, May 13). Retrieved July 16, 2019, from <https://www.epa.gov/greenpower/renewable-energy-certificates-recs>

While effective, this approach was initially deprioritized by stakeholders during workshops as a less-than-optimal approach for getting to 100 percent renewable energy if it were used instead of implementing onsite generation (either through direct ownership or leasing). Municipalities would expend capital to buy the RECs, which does not necessarily have the same local benefits such as local job creation, cleaner air, or visibility as other strategies like on-site generation. Despite this, the purchase of RECs would help the municipalities make up the difference to meet their renewable energy goals by 2030 by buying enough RECs to match the City and County's consumption of non-renewable energy (such as electricity from non-renewable sources, natural gas and other fuels). As mentioned above, this would require the City and County to pay an annual cost to purchase RECs, and depending on how the purchase would be funded, this may have negative impacts on other programs locally. REC prices vary across the country, with RECs from locally-based (in North Carolina) renewable energy prices tending to be more expensive, than those purchased from national voluntary markets.

- The City has the power to purchase as many RECs as needed based on how much they would like to pay. Assuming that the City's remaining energy needs are met via pathways A, B, and C, this analysis estimates that about 18 percent of the City's remaining renewable energy needs could be met by REC purchases by 2030, or about 4,000 MWh annually. This is estimated to cost the City around \$6/MWh, if purchased locally.⁹¹ This would amount to about \$24,000 annually for the City.
- The County, likewise, has the power to purchase as many RECs as needed based on how much they would like to pay. Assuming that the County's remaining municipal energy needs are met via pathways A, B, and C, this analysis estimates that the County's renewable energy shortfall would also hover around 18 percent of the County's energy consumption, or about 4,500 MWh annually. This could be matched by REC purchases, which is estimated to cost the County around \$6/MWh, if purchased locally.⁹² This would amount to about \$36,000 annually for the County.

D.2. Residents and businesses purchase RECs

This action would ask local residents, businesses, and organizations to purchase renewable energy certificates. While this option to purchase RECs among members of the community may increase in frequency as businesses make sustainability goals or set energy goals, it is less likely that there will be wide-scale adoption of REC purchases among residents to meet the county-wide goal.

Members of the greater Buncombe County community cannot be mandated to purchase RECs. This analysis assumed that members of the Buncombe County community would have a maximum participation rate of the most successful U.S. Green Power Program participation rate, which was Portland General Electric's participation rate of 19.44 percent of all utility customers in 2017.

- This analysis estimates that about 19.5 percent of the County's community-wide energy consumption could be matched by REC purchases by 2042, or about 715,000 MWh annually. This is expected to cost community members around \$6/MWh, if purchased locally.⁹³ Because this

⁹¹ Eric O'Shaughnessy, Jenny Heeter, and Jenny Sauer, *Status and Trends in the U.S. Voluntary Green Power Market (2017 Data)*, NREL, retrieved from <https://www.nrel.gov/docs/fy19osti/72204.pdf>

⁹² Eric O'Shaughnessy, Jenny Heeter, and Jenny Sauer, *Status and Trends in the U.S. Voluntary Green Power Market (2017 Data)*, NREL, retrieved from <https://www.nrel.gov/docs/fy19osti/72204.pdf>

⁹³ Eric O'Shaughnessy, Jenny Heeter, and Jenny Sauer, *Status and Trends in the U.S. Voluntary Green Power Market (2017 Data)*, NREL, retrieved from <https://www.nrel.gov/docs/fy19osti/72204.pdf>

percentage only applies to the electricity mix, the overall impact of REC purchases in the community is closer to 14 percent of the county's overall energy requirements in 2042.

D.3. The purchase of renewable energy through Duke Energy Progress

DEP's Green Source Advantage Program (GSA) would allow for large, non-residential customers, defined as those with a Contract Demand between 1,000 kW and 100,000 kW, to procure renewable energy through the program once it is approved by the NCUC.⁹⁴ With a total capacity of 600 MW between DEP and DEC, this program allows DEP and DEC customers to select a renewable energy developer and negotiate contract length and price terms for the energy and the associated RECs directly with the developer. Then the RE developer enters into a PPA with DEP for the energy transferred to DEP's grid, and the customer receives RECs and a GSA bill credit on their monthly bill from DEP.⁹⁵

- Assuming that the City could take advantage of half of the entire 90 MW available to non-residential customers in NC's Green Source Advantage Program, the City could purchase up to 23,000 MWh annually, or about 82 percent of its remaining renewable energy needs in 2030. Participation in this program requires a one-time participation cost of \$2,000,⁹⁶ and an annual administration cost of \$4,500.⁹⁷ Because DEP requires participants in this program to negotiate their own REC purchases, this cost will vary. Assuming it would be similar to the current NC REC cost of about \$6/MWh, this cost would be estimated at about \$99,000 annually for the City.
- Assuming that the County could take advantage of the other half of the entire 90 MW available to non-residential customers in NC's Green Source Advantage Program, the County could purchase up to 25,000 MWh annually, or about 80 percent of its remaining renewable energy needs in 2030. Participation in this program requires a one-time participation cost of \$2,000,⁹⁸ and an annual administration cost of \$4,500.⁹⁹ Because DEP requires participants in this program to negotiate their own REC purchases, this cost will vary. Assuming it would be similar to the current NC REC cost of about \$6/MWh, this cost would be estimated at about \$106,000 annually for the County.
- Assuming that the greater Buncombe County community would take advantage of about 12.5 MW of the 500 MW available for non-military customers in their Green Source Advantage program, this policy option could contribute about 17,000 MWh of renewable energy to the Buncombe County community each year, which gets the community to about 4.4 percent of its overall goal by 2042.

⁹⁴ https://www.duke-energy.com/_/media/pdfs/for-your-home/rates/electric-nc/g9ncschedulelgsdep.pdf?la=en

⁹⁵ NC Green Source Advantage Program. (n.d.). Retrieved July 16, 2019, from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage>

⁹⁶ NC Green Source Advantage Program. (n.d.). Retrieved July 16, 2019, from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage#tab-cb6d14f8-3824-4030-9f77-46a0662ec6a4>

⁹⁷ NC Green Source Advantage Program. (n.d.). Retrieved July 16, 2019, from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage#tab-cb6d14f8-3824-4030-9f77-46a0662ec6a5>

⁹⁸ NC Green Source Advantage Program. (n.d.). Retrieved July 16, 2019, from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage#tab-cb6d14f8-3824-4030-9f77-46a0662ec6a4>

⁹⁹ NC Green Source Advantage Program. (n.d.). Retrieved July 16, 2019, from <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage#tab-cb6d14f8-3824-4030-9f77-46a0662ec6a5>

Overall Renewable Energy Impacts of Pathway D

This analysis includes assumptions for each policy (outlined in **Appendix B**), including factors such as frequency of implementation, time-scale, and generation displacement based on examples from other cities, counties, and towns in the U.S. that have implemented similar policies.

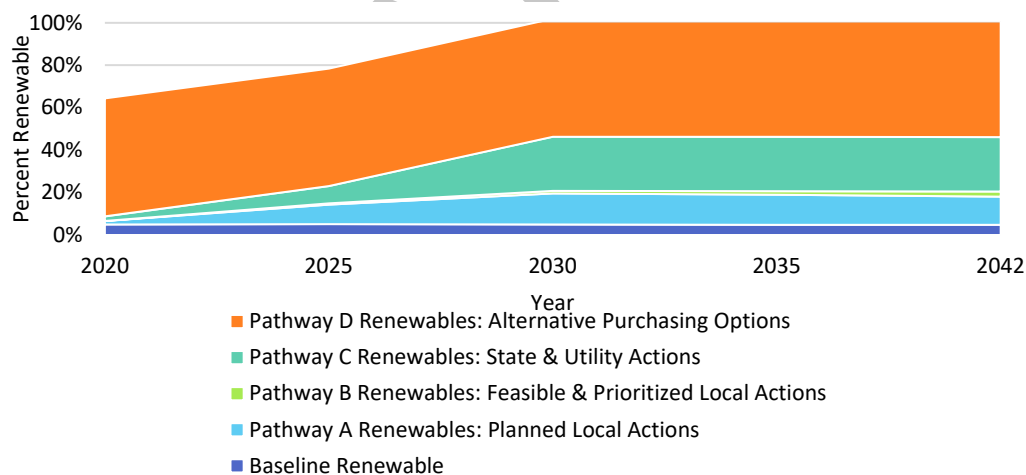
Box 16 below details the expected energy impacts if each action under Pathway D were implemented to its fullest extent.

Box 16: Pathway D - Overall Energy Impacts on Renewable Energy Goals



Under Pathway D, the City of Asheville could achieve its 100 percent municipal goal by 2030.¹⁰⁰ Because the City has the power to purchase RECs and enter into PPAs through DEP, it has the ability to match all remaining MWh of electricity and therms of natural gas that are not considered renewable by 2030. Assuming that all policies in Pathways A, B, and C are first pursued, this analysis estimates that the City would need to purchase an additional 16,800 MWh in 2030 to reach the goal of 100 percent renewable energy among municipal operations (see **Figure 18**). This is expected to cost the City a little over \$100,000 per year, though REC prices and PPA prices would fluctuate and vary.

Figure 18: City of Asheville Municipal Renewable Energy with Pathways A, B, C, and D**



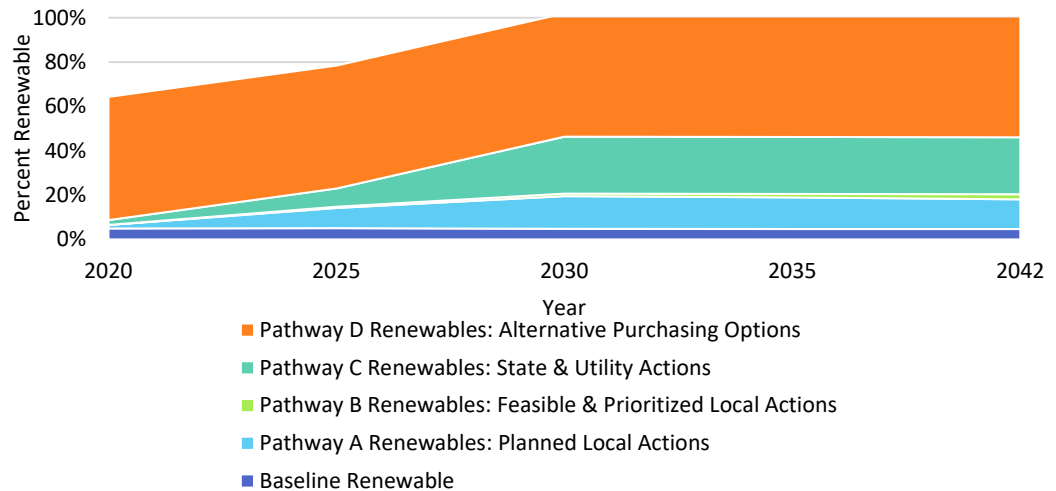
****This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.**

¹⁰⁰ While it is also possible for the City to purchase all its renewable energy needs using RECs, stakeholder feedback strongly indicated that RECs should be used by the City as a final method to reach the renewable energy target, not the primary method. It was important to stakeholders to create local benefits through onsite generation and lasting policy changes as part of the renewable energy transition.



Under Pathway D, Buncombe County can achieve its 100 percent renewable energy goal by 2030. Like the City, Buncombe County can purchase RECs and enter into PPAs through DEP, and it has the ability to match all remaining MWh of electricity and therms of natural gas that are not considered renewable by 2030. This analysis estimates that if prior actions are implemented locally and at the state level, this could result in 15,600 MWh of renewable energy, and an annual cost to the County of a little under \$95,000 (see **Figure 19**).

Figure 19: Buncombe County Municipal Renewable Energy with Pathways A, B, C, and D**

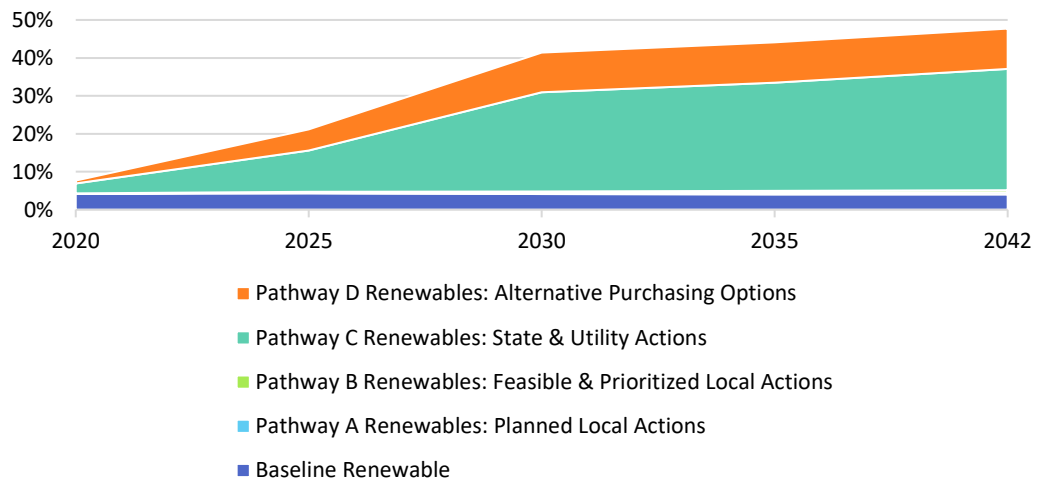


**This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.



Under Pathway D, it is expected that residents and businesses are less likely to purchase RECs and PPAs. Therefore, this analysis provides a conservative estimate that renewable energy will increase by 10 percent by 2042 in the total community-wide mix (see **Figure 20**).

Figure 20: Buncombe County Community-Wide Renewable Energy with Pathways A, B, C and D**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

Box 17: Non-Energy Benefits of Pathway D

Renewable energy can bring additional benefits beyond more sustainable energy sources – including greenhouse gas emissions reduction, the creation of new clean energy jobs, and health benefits from cleaner air. According to the analysis, actions under Pathway D could result in the purchase of 2,311,853 MWhs of renewable energy attributes annually. This amount of renewable energy is associated with:

- An estimated \$1.5-3.5 million in total health benefits;¹⁰¹
- Approximately 20,000 tons of CO₂ and other harmful emissions kept out of the environment every month;¹⁰² and
- Supporting approximately 7,348 cumulative full-time employees.¹⁰³

¹⁰¹ CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. (2019, May 24). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool>

¹⁰² AVOIDED Emissions and geneRation Tool (AVERT). (2019, May 22). Retrieved July 15, 2019, from <https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert>

¹⁰³ Jobs and Economic Development Impact (JEDI) Models: NREL. (n.d.). Retrieved July 15, 2019, from <https://www.nrel.gov/analysis/jedi/>

City of Asheville Action Steps for 2030

This chapter summarizes the results of the analysis above and outlines the action steps that the City of Asheville can undertake to achieve its goal of supplying 100 percent of its municipal operations energy from renewable sources by December 31, 2030. The action steps are organized by whether they are currently ongoing, or are feasible in the near-, medium-, or long-term.

Results of Analysis

Asheville municipal buildings consumed 15,900 MWh of electricity and about 352,000 therms of natural gas in 2018.^{104,105} This energy mix breaks down to about 61 percent electricity and 39 percent natural gas for municipal energy consumption. Currently, about 4.5 percent of the overall municipal building consumption is supplied by renewable energy. In the baseline scenario, about 4.8 percent of the overall municipal consumption will be supplied by renewable energy in 2030. To acquire additional renewable energy to meet its 100 percent goal, the City will need to take further action beyond what the utilities are doing.

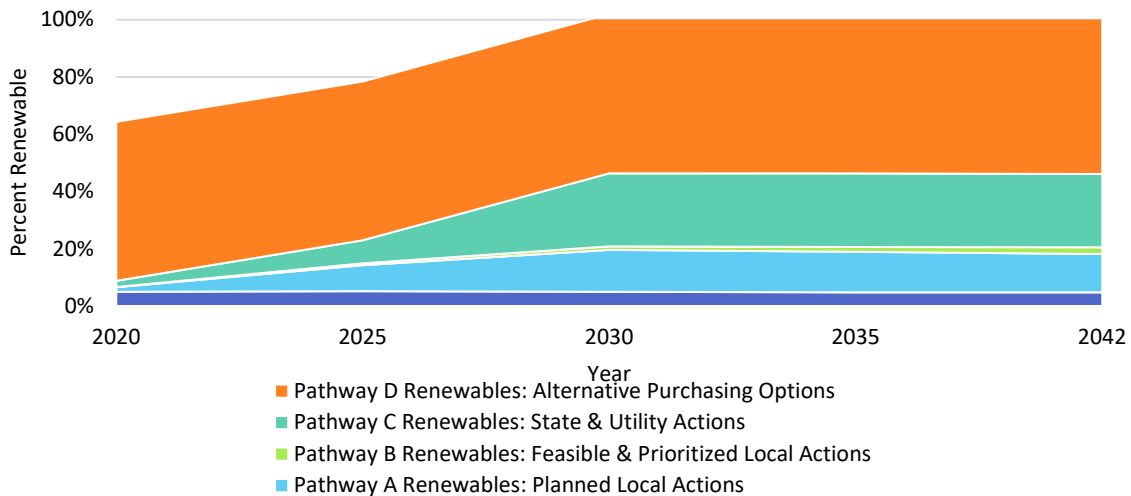
A transition to 100 percent renewable energy requires a combination of short-term wins with longer-term changes. Although near-term actions cannot get the City to its 100 percent goals for 2030, these actions are important blocks upon which to build progress towards this goal. This analysis demonstrates that it is within the City's control to meet these goals, without constraints regarding funding, and political will. Longer-term, collaboration with the state and utilities could be beneficial to help the City meet these goals in a more cost-efficient way.

According to the analysis, the City of Asheville can meet its 2030 goal based on Pathway D alone. The City's ability to purchase RECs can help the City match any non-renewable energy sources utilized by 2030 and achieve or even exceed its 100 percent renewable energy goal. It is important to note that the City can make substantial progress towards the 2030 goal through local actions as well. By continuing with planned local actions and implementing additional feasible and prioritized local actions, the City can achieve roughly 20 percent of its goal (Pathways A and B). If renewable energy policies were implemented at the state level, the City could achieve an additional 25 percent renewable energy, for a total of approximately 45 percent by 2030 (Pathway C). Implementation of Pathways A through C are important to reduce the need for RECs in the long-term (see **Figure 21**).

¹⁰⁴ Duke Energy Progress 2018 IRP, available at <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=25fb3634-54b6-464b-9704-b6fe99cda1a8>, Direct Data request via Correspondence with Robert Sipes, Vice President Western Carolinas Modernization, Duke Energy

¹⁰⁵ Correspondence with Ryan Childress, Manager, Midstream at Dominion Energy

Figure 21: City of Asheville Renewable Energy Mix with Potential Pathways**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

Actions for the City of Asheville

From the analysis, it is clear that ongoing City investments in renewable energy, energy efficiency, and renewable thermal technologies at its facilities will allow Asheville to make immediate progress towards its 2030 goal (Pathways A and B). The local and environmental benefits of these actions have been evaluated as high, and they demonstrate City leadership. In the near-term and medium-term, the City should pursue aggregated procurement and an internal renewable energy requirement on new construction and renovations at City facilities as mechanisms by which to install more onsite renewable energy.

Purchasing RECs is a medium- to long-term option (Pathway D). This option allows the City to meet its 2030 goal, but it has not been immediately prioritized by stakeholders and has lower local benefits than some of the ongoing and near-term actions. RECs present an annual cost to the City to help match non-renewable energy consumption. Additionally, state level policies can dramatically increase the number of renewables in the municipal energy mix (Pathway C). However, the City does not have direct control on these actions and the changes and the timeline to implement them are not guaranteed. The City should engage with the state and utilities on an ongoing basis. The City of Asheville can take steps ongoing, and in the near-, medium-, and long-term to meet these renewable energy goals for municipal facilities, as outlined below. The actions identified below reflect the results of energy modeling, stakeholder priorities, and policy analysis:

Ongoing Actions

- **Install and directly own renewable energy on City-owned property (A.1).** Based on the analysis, it is recommended that the City install renewable energy systems on municipal properties with direct ownership.
- **Lease City-owned property to utility for renewable energy development (A.3.)** It is recommended that the City enter into solar leases with Duke Energy Progress for installations at municipal sites.

- **Continue investments in energy efficiency and renewable thermal technologies.**¹⁰⁶ It is recommended that the City identify municipal building upgrades and retrofits needed for energy efficiency, renewable heating and cooling, or fuel switching.
- **Continue to support a Revolving Investment Program for Renewable Energy on City-owned property (B.4.)** It is recommended that the City continue to support its Revolving Investment Program for municipal facilities to support renewable energy installations.
- **Dedicate staff time and resources to monitoring and engaging in conversations on state-level policies (C.1-5)** It is recommended that the City dedicate resources to engage and monitor conversations on state level policies that could support renewable energy development, support the local renewable energy market, or encourage the utilities to increase renewables within their portfolios.
- **Dedicate staff time and resources to monitoring and engaging in conversations on utility level policies (C.1-5)** It is recommended that the City dedicate resources to engage and monitor changes at the utility level, or by the NCUC, that could support renewable energy development.

Near-term actions

- **Adopt internal policy requiring renewable energy installations on City-owned property during new construction or major renovation (B.2.)** Based on the analysis, it is recommended that the City explore implementing an internal policy which would require renewable energy installations at municipal sites at the time of construction or major renovation.

Medium-term actions

- **Work with other entities to install renewable energy through an aggregated procurement.**¹⁰⁷ The City is encouraged to work with local entities to install renewable energy as well, by creating an aggregated procurement process in which the sites would include City buildings/properties as well as community organization or commercial buildings in the City.

Long-term actions

- **Purchase renewable energy certificates (RECs) (D.1.)** Long-term, it is recommended that the City explore the purchase renewable energy certificates to meet the renewable energy goals for municipal facilities.
- **Purchase renewable energy through Duke Energy Progress (D.3.)** It is recommended that the City explore options to make renewable energy purchases through Duke Energy Progress.

Box 18: Actions to Support the 2042 Goal

The City of Asheville is supportive of Buncombe County's 100 percent renewable energy by 2042 community-wide goal. There are several actions that the City can take to support Buncombe County and the broader community in making progress towards these goals.

- **Provide education, outreach, capacity-building support to community on renewable energy** (see Capacity-Building Actions). Stakeholders noted that more education will be needed community-wide to support the renewable energy transition, the local renewable energy market, and workforce development.
- **Provide ongoing support for Solarize-style campaigns (B.3.)** It is recommended that the City support local campaigns to deploy more renewable energy technologies for residents, businesses and nonprofits.

¹⁰⁶ This action was not modeled, but noted as important by the advisory committees and stakeholders.

¹⁰⁷ This action was not modeled, but noted as important by stakeholders.

- **Provide resources to residents and businesses on Renewable Energy Certificate purchasing (D.2.)**
Providing more clarity to this process could increase purchases within the community to help make progress towards these goals.

Limitations of this Analysis

The City of Asheville can achieve 100 percent renewable energy in municipal facilities by 2030 with direct City action. However; as noted above, changes at the state level or at the utility are necessary to help the City meet these goals in a more cost-effective way.

This analysis does not include necessary changes to heating, cooling, transportation, and cooking fuels. The City will need to undertake an additional analysis to understand the efficiency conversions associated with fuel switching for these applications to renewable sources or electricity.

Finally, renewable energy cannot be considered in isolation without other forms of energy conservation technologies, such as energy efficiency, grid modernization, electric heating and cooling technologies, demand-response, and storage. In addition to reducing overall energy usage and peak demand times, these mechanisms can support efforts in the renewable energy transition by increasing efficiency, reducing grid-demand, and overall energy demand.

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Table 7: City of Asheville Action Steps for 2030

	Action	Timeframe	Implementing Departments	Activities of City	Types of Costs to the City	Support Needed
Actions Currently Undertaken	Install and directly own renewable energy on City-owned property	Ongoing	Legal, Capital Projects Management, Purchasing, Public Works, Sustainability	<ol style="list-style-type: none"> 1. Allocation of funds for investment; 2. Site feasibility analyses; 3. RFP development and release; 4. Bid reviews and analyses; 5. Negotiation; 6. Construction; 7. Ongoing operations and maintenance 	Staff time, capital costs, operations and maintenance	Ongoing operations and maintenance
	Lease City-owned property to utility for renewable energy development	Ongoing	Urban Planning and Development, Legal, Capital Projects Management, Purchasing, Sustainability, Public Works	<ol style="list-style-type: none"> 1. Identify potential sites for leasing potential; 2. Engage in discussions with electric utility on interest on solar PV development. 3. Contract negotiation. 	Staff time	Initial Negotiation Support
Local Actions, Highly Feasible	Continue supporting a Revolving Investment Program for Renewable Energy on City-owned property	Ongoing	Purchasing, Capital Projects Management, Sustainability, Public Works	<ol style="list-style-type: none"> 1. Continue capitalization where necessary; 2. Prioritize and fund projects. 	Staff time, capitalization of fund	Ongoing Management of Program
	Adopt internal policy requiring renewable energy installations on City-owned property during new construction or major renovations.	Near-term	Capital Projects Management, Public Works, Sustainability	Draft internal policy.	Allocation of funds for renovations and construction, staff time	Ongoing support to facilities and construction
	Work with other entities to install renewable energy through an aggregated procurement	Medium-term	Sustainability, Legal, Purchasing, Capital Projects Management, Public Works	<ol style="list-style-type: none"> 1. Identify potential entities within the County; 2. Develop and issue RFP; 3. Bid analysis and selection; 4. Contract negotiation; 5. Construction; 6. Operations and Maintenance. 	Staff time, capital costs, operations and maintenance	Ongoing operations and maintenance

	Action	Timeframe	Implementing Departments	Activities of City	Types of Costs to the City	Support Needed
Alternative Purchasing Options	Purchase Renewable Energy Credits (RECs)	Long-Term	Sustainability Office, Purchasing, Finance, Legal	1. Provide resources to community members	Staff time, Capital costs	Initial capital support
State, Utility Engagement	Dedicate staff time and resources to monitoring and engaging in conversations on state-level policies	Ongoing	Sustainability Office	<ul style="list-style-type: none"> Identify staff that can engage in renewable energy policy conversations and relevant opportunities to do so. 	Staff Time, Contractor Costs as Needed	Ongoing
	Dedicate staff time and resources to monitoring and engaging in conversations on utility policies	Ongoing	Sustainability Office	<ul style="list-style-type: none"> Continue work with the EITF, and local utilities, to identify ways for utilities to support Buncombe County's goals. 	Staff Time, Contractor Costs as Needed	Ongoing
Additional Actions (not modeled)	Continue investments in energy efficiency and renewable thermal technologies.	Ongoing	Sustainability, Legal, Purchasing, Capital Projects Management, Public Works	<ul style="list-style-type: none"> Identify opportunities to reduce energy consumption in facilities and switch thermal load to electricity or renewable sources 	Staff time, capital costs	Capital support, staff time for procurement support, staff capacity-building

Buncombe County Action Steps for 2030

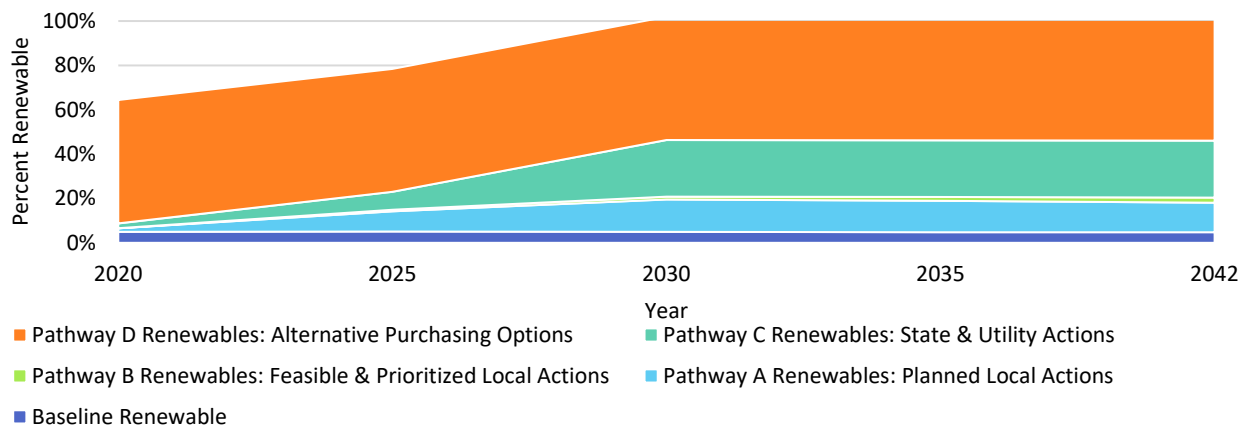
This chapter summarizes the results of the analysis above and outlines the action steps that Buncombe County can undertake to achieve its goal of utilizing 100 percent renewable energy for county municipal operations by 2030. The action steps outlined below are within the direct control of Buncombe County to transition energy in its municipal buildings to 100 percent renewable energy, and are organized by whether they are currently ongoing, or are feasible in the near-, medium-, or long-term.

Results of Analysis

Buncombe County’s municipal operations consumed 17,000 MWh of electricity and about 404,000 therms of natural gas in 2018.^{108,109} This energy mix breaks down to about 59 percent electricity and 41 percent natural gas for municipal energy consumption. Currently, about 4.5 percent of the overall municipal building consumption is supplied by renewable energy. In the baseline scenario, about 4.8 percent of the overall County municipal consumption will be supplied by renewable energy in 2030 (see **Table 2** above for more detail). The County will therefore need to take additional steps to meet the municipal goal.

Based on the modeled pathways, this analysis has identified that it is possible for the County to achieve 100 percent renewable energy within municipal facilities. Specifically, this is due to the County’s ability to purchase RECs to match its energy consumption. Additionally, changes at the state level, and local actions can help reduce the number of RECs that will need to be purchased annually by increasing local generation for municipal facilities or changing the utility power mixes to be more renewable. Local actions at the county level can achieve about 20 percent renewable energy, and state and utility actions can get the County municipal operations to about 45 percent renewable energy by 2030 (see **Figure 22**).

Figure 22: Buncombe County Municipal Renewable Energy Mix with Potential Pathways**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

¹⁰⁸ Duke Energy Progress 2018 IRP, available at <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=25fb3634-54b6-464b-9704-b6fe99cda1a8>, Direct Data request via Correspondence with Robert Sipes, Vice President Western Carolinas Modernization, Duke Energy

¹⁰⁹ Correspondence with Ryan Childress, Manager, Midstream at Dominion Energy

Actions for Buncombe County

There are several direct actions the County can take towards its 2030 municipal goal. Ongoing County investments in renewable energy, energy efficiency, and renewable thermal technologies at its facilities can help the County make immediate progress towards the County's 2030 municipal goal.

While the County can purchase RECs to meet its 2030 goal, this action has been deemed a medium to long-term priority, with stakeholders and the County favoring methods to increase renewable energy generation onsite and in County facilities in the near term. Near-term actions and ongoing actions will be important to continue to increase renewable energy generation locally, visibly demonstrate leadership in the County, and build momentum for achieving the 2030 goal. Visibility in the near-term is also important to demonstrate and educate other entities within the community to make progress towards the 2042 target.

In the medium-term, the County can also take steps internally to promote renewable energy. Specifically, it could consider implementing and seeding an internal green investment fund to help departments and facilities fund the necessary investments. This would allow the County to have an ongoing source for financing municipal projects.

State level policies, which the County has less direct control over, could potentially be the most impactful way to change the energy mix, however, they are not guaranteed to move forward. The County is already involved in a number of collaborative efforts, and it can continue to engage with the state and utility on an ongoing basis. Buncombe County can take many steps in the near-, medium-, and long-terms, and ongoing to meet these renewable energy goals for municipal facilities, as outlined below. The recommendations below reflect the results of energy modeling, stakeholder priorities, and policy analysis for Buncombe County:

Ongoing Actions

- **Install and directly own renewable energy on County-owned property (A.1.)** As opportunities arise, it is recommended that the County explore ways to increase directly owned renewable energy systems on County property
- **Lease County-owned property to utility for renewable energy development (A.3.)** Based on the analysis, it is recommended that the County consider entering into solar lease agreements with DEP for installations at municipal sites.
- **Continue investments in energy efficiency and renewable thermal technologies.**¹¹⁰ The County should identify municipal building upgrades and retrofits needed for energy efficiency, renewable heating and cooling, or fuel switching.
- **Dedicate staff time and resources to monitoring and engaging in conversations on state-level policies (C.1-5)** It is recommended that the County continue to dedicate resources to engage and monitor in conversations on state level policies that could support renewable energy development, support the local renewables market, or encourage the utilities to increase renewables within their portfolios.
- **Dedicate staff time and resources to monitoring and engaging in conversations on utility level policies (C.1-5)** It is recommended that the County dedicate resources to engage and monitor changes at the utility level, or by the NCUC, that could support renewable energy development.

¹¹⁰ This action was not modeled, but stakeholders indicated that it should be included within the actions.

Near-term actions

- **Adopt internal policy requiring renewable energy installations on County-owned property during new construction or major renovation (B.2.)** It is recommended that the County explore implementing an internal policy which would require renewable energy installations at municipal sites at the time of construction or major renovation.
- **Work with other entities to install renewable energy through an aggregated procurement.**¹¹¹ As a near-term step, it is recommended that the County continue its effort to encourage local entities to install renewable energy as well, by creating an aggregated procurement process in which the sites would include County buildings/properties as well as community organization or commercial buildings in the County.

Medium-term actions

- **Implement a Revolving Investment Program for Renewable Energy on County-owned property (B.4.)** It is recommended that the County explore the feasibility of creating a Revolving Investment Program for municipal facilities to provide capital funding for renewable energy installations.
- **Purchase Renewable Energy Certificates (RECs) (D.1.)** Medium-term, it is recommended that the County explore purchasing renewable energy certificates to meet the renewable energy goals for municipal facilities.

Long-term actions

- **Purchase renewable energy through Duke Energy Progress (D.3.)** Lastly, it is recommended that the County explore renewable energy purchases through DEP long-term as options become viable.

Limitations of this Analysis

Buncombe County can achieve 100 percent renewable energy in municipal facilities by 2030 with direct County action alone. However, as noted above, changes at the state level or at the utility may help the County meet these goals in a more cost-effective way.

This analysis does not include necessary changes to heating, cooling, transportation, and cooking fuels. The County will need to undertake an additional analysis to understand the efficiency conversions associated with fuel switching for these applications to renewable sources or electricity.

Finally, it is important to note that renewable energy cannot be considered in isolation without other forms of energy conservation technologies, such as energy efficiency, grid modernization, electric heating and cooling technologies, demand-response, and storage. In addition to reducing overall energy usage and peak demand times, these mechanisms can support efforts in the renewable energy transition by increasing efficiency, reducing grid-demand, and overall energy demand.

¹¹¹ This action was not modeled, but stakeholders indicated that it is important and should be included within the actions.

Table 8: Buncombe County Potential Action Steps towards 2030

	Action	Type of Strategy	Implementing Departments	Activities of County	Types of Costs to the County	Support Needed
Actions Currently Undertaken	Install and directly own renewable energy on County-owned property	Ongoing	County Attorney, Finance, GIS, Procurement, Sustainability Office	<ol style="list-style-type: none"> 1. Allocation of funds for investment; 2. Site feasibility analyses; 3. RFP development and release; 4. Bid reviews and analyses; 5. Negotiation; 6. Construction; 7. Ongoing operations and maintenance 	Staff time, capital costs, operations and maintenance	Ongoing operations and maintenance
	Lease County-owned property to utility for renewable energy development	Ongoing	Planning/Zoning, County Attorney, Finance, GIS, Procurement, Sustainability Office	<ol style="list-style-type: none"> 1. Identify potential sites for leasing potential; 2. Engage in discussions with electric utility on interest on solar PV development. 3. Contract negotiation. 	Staff time	Initial Negotiation Support
Local Actions, Highly Feasible	Implement a Revolving Investment Program for Renewable Energy on County-Owned Property	Medium-Term	Finance, Facilities, Sustainability Office	Provide seed funding to the program; Create selection criteria or process for project prioritization. Select projects to fund.	Staff time, capitalization of fund	Ongoing Management of Program
	Adopt internal policy requiring renewable energy installations on County-owned property during new construction or major renovations.	Near-term	County Commissioners, Sustainability Office, Facilities, Finance	Draft internal policy.	Allocation of funds for renovations and construction, staff time	Ongoing support to facilities and construction
	Work with other entities to install renewable energy through an aggregated procurement	Near-term	Sustainability Office, Facilities, Finance, Procurement	<ol style="list-style-type: none"> 1. Identify potential entities within the County; 2. Develop and issue RFP; 3. Bid analysis and selection; 4. Contract negotiation; 5. Construction; 6. Operations and Maintenance. 	Staff time, capital costs, operations and maintenance	Ongoing operations and maintenance
Alternative Purchasing	Purchase renewable energy credits (RECs)	Medium-term	Sustainability Office, Finance, Procurement, County Attorney	<ol style="list-style-type: none"> 1. Establish criteria for REC purchases (e.g. local to NC, additional to the grid, etc.). 2. Identify vendors; 3. Sign up through utility or partner to purchase credits. 	Staff time, Capital costs	Initial capital support

	Action	Type of Strategy	Implementing Departments	Activities of County	Types of Costs to the County	Support Needed
State, Utility Engagement	Dedicate staff time and resources to monitoring and engaging in conversations on state-level policies	Ongoing	Sustainability Office	<ul style="list-style-type: none"> Identify staff that can engage in renewable energy policy conversations and relevant opportunities to do so. 	Staff Time, Contractor Costs as Needed	Ongoing
	Dedicate staff time and resources to monitoring and engaging in conversations on utility policies	Ongoing	Sustainability Office	<ul style="list-style-type: none"> Continue work with the EITF, and local utilities, to identify ways for utilities to support Buncombe County's goals; 	Staff Time, Contractor Costs as Needed	Ongoing
Additional Actions, (not modeled)	Continue investments in energy efficiency and renewable thermal technologies.	Ongoing	Sustainability Office, Finance, Procurement, County Attorney, Facilities	<ul style="list-style-type: none"> Identify opportunities to reduce energy consumption in facilities and switch thermal load to electricity or renewable sources 	Staff time, capital costs	Capital support, staff time for procurement support, staff capacity-building

Buncombe County Community-Wide Actions Steps for 2042

This chapter summarizes the results of the analysis above and outlines the action steps that Buncombe County can undertake to help achieve its goal utilizing 100 percent renewable energy County-wide by 2042.¹¹² The County government's own energy use makes up less than one percent of the community-wide energy use, which limits the County's ability to directly impact progress towards the community-wide goal. Despite this, there are a number of direct actions that the County can take to support this goal. The action steps outlined below are within the direct control of Buncombe County to transition its community-wide building energy consumption to be supplied by 100 percent renewable energy, and are organized by whether they are currently ongoing, or are feasible in the near-, medium-, or long-term.

Results of Analysis

Residential, commercial, industrial, and municipal facilities in Buncombe County consumed 3,000,000 MWh of electricity and about 100,000,000 therms of natural gas in 2018. This energy mix breaks down to about 51 percent electricity and 49 percent natural gas for community energy consumption. Currently, about 4.5 percent of the overall building consumption is supplied by renewable energy. In the baseline scenario, only 4 percent of energy consumed by buildings in the County will be renewable in 2042.

A transition to 100 percent renewable energy requires a combination County, state, utility, and community action. The actions within the analysis will not achieve 100 percent renewable energy community-wide by 2042. Many of these actions are focused on what is within the County government's power to directly control, or reliant on state or community members to influence. County-government activities combined with DEP's baseline get the County to approximately 4.5 percent of its 2042 goal. With community purchases of RECs and green power, the community could achieve approximately another 10 percent renewable energy by 2042. Implementation of the modeled state policies could help achieve an additional 32 percent renewable energy by 2042. Thus, the total amount currently modeled as possible is approximately 48 percent renewable energy by 2042.

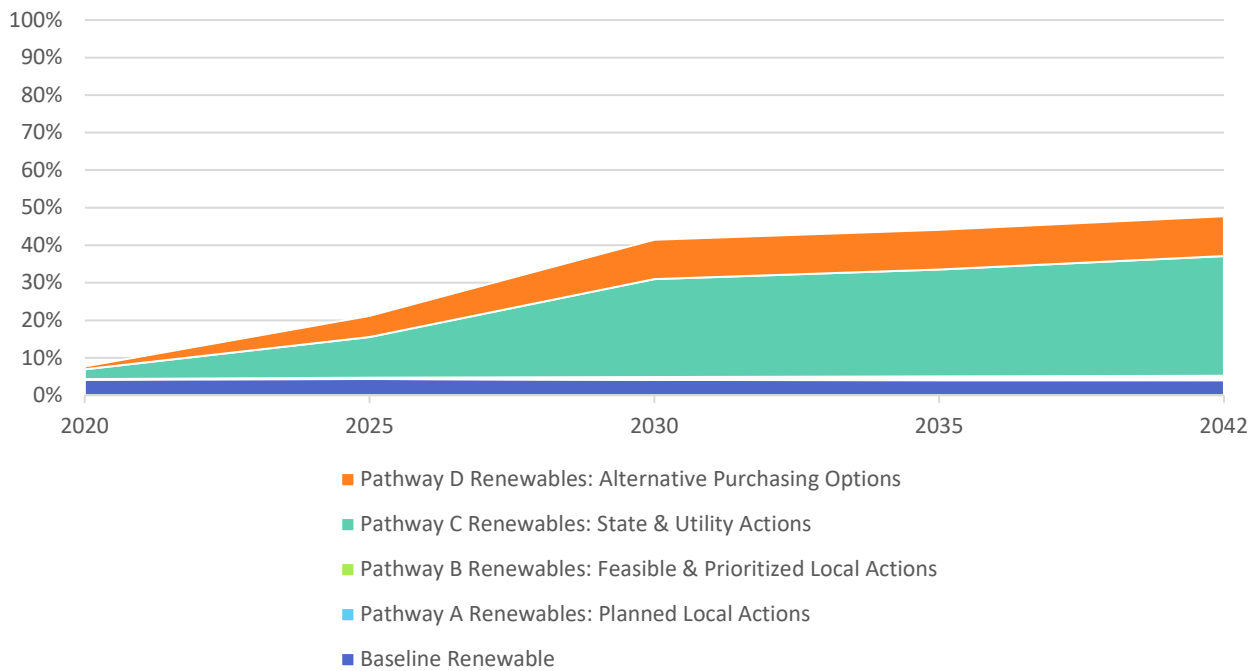
The County does have direct control over some actions. The County can encourage local residents, businesses, industry, nonprofits and community organizations to play a part in the renewable energy transition. Specifically, this will include increasing the amount of local renewable energy generation in the community, as well as supporting state policies to enable more renewable energy development. In order to facilitate community action, education and outreach on renewable energy opportunities and development is necessary. Outreach and education should focus on increasing access to renewable energy for all community-members ensuring meaningful opportunities for community participation and input.

State-level changes are shown to have the greatest overall impact on the community-wide goal. This is largely because state-level actions can increase renewables in DEP's electricity mix, a source that that community-members currently use. Additionally, many of these state-level actions within Pathway C are aimed at providing more opportunities for financing renewable energy projects for residents and businesses. The

¹¹² Although the Pathways focus primarily on developing a renewable electricity supply, the target also includes transitioning to renewable energy in buildings and transportation technology.

analysis of pathways also indicated that while local generation and local actions have a smaller impact on the overall community energy mix, locally-based actions bring important additional benefits to the community.

Figure 23: Buncombe County Community-Wide Renewable Energy with Pathways A, B, C and D**



***This graph focuses only on site-energy consumption and does not make any assumptions around fuel-switching. It is important to note that thermal and electric consumption may not be directly comparable.*

County Actions for Buncombe’s Community-Wide Goal

Many of the strategies below represent direct actions that Buncombe County government can take to support the community-wide goal. While achieving the goal cannot be directly accomplished by the County government, there are ways in which the County can prioritize resources, collaboration, and stakeholder involvement to encourage progress. Not all of these strategies have been modeled,¹¹³ but have been identified by stakeholders as important to help meet these goals. See **Table 9** for more information.

The County should provide ongoing support to the community on renewable energy, energy efficiency, and renewable thermal technology investments through education, trainings, workshops, and outreach materials. These resources can focus on how to install renewable energy, financing options, and metrics tracking. In the near-term and ongoing, the County can encourage onsite renewable energy generation within the County by supporting an aggregated procurement, bulk purchasing programs, and solar leasing. In the medium-term, the County could consider implementing and seeding a revolving loan fund for residents to help fund investments in renewable energy. State-level policy changes could help provide the community with more means to meet their goals. Continued engagement with the EITF, utilities, and state level conversations could help move the needle in the long-term on making this goal achievable. Buncombe County can take many steps in the near-, medium-, and long-terms, and ongoing to meet the 2042 renewable energy goal as outlined below.

¹¹³ Not all policies within the action plan were modeled for energy impacts as not enough data was available to make confident policy assumptions.

Ongoing

- **Lease County-owned property to utility or developer for renewable energy development (A.3.)** It is recommended that the County explore opportunities for land lease agreements with developers or utilities for renewable energy development.
- **Host a bulk-purchasing program (e.g. Solarize campaign) (B.3.)** Under this action, the County would support the procurement of developers for local bulk-purchasing campaigns on an ongoing basis to promote more renewable energy in the community. It is recommended that the County explore opportunities to support these programs locally.
- **Continue to engage the EITF to explore strategies related to incentive programs, utility programs, capital resources (Energy Innovation Task Force Actions).** It is recommended that the County continue to collaborate with organizations and efforts to support state-wide policy changes, utility engagement, and local opportunities to support the community-wide goal.
- **Provide resources, tools and education to community members on renewable energy, energy efficiency, and transportation options; as well as resources for reducing energy use (Capacity-Building Actions).** It is recommended that the County should find opportunities to provide community members with workshops, trainings, and information on renewable energy development and purchasing opportunities.
- **Work with area nonprofits and universities to establish workforce training and development for renewable energy (Capacity-Building Actions).** Based on stakeholder feedback, it is recommended that the County explore ways to support the renewable energy workforce. Under this action, the County would collaborate with local technical schools, universities and public schools to ensure that renewable energy is a part of curriculum locally.
- **Dedicate staff time and resources to monitoring and engaging in conversations on state-level policies (C.1-5)** It is recommended that the County continue to dedicate resources to engage and monitor in conversations on state level policies that could support renewable energy development, support the local renewables market, or encourage the utilities to increase renewables within their portfolios on an ongoing basis.
- **Dedicate staff time and resources to monitoring and engaging in conversations on utility level policies (C.1-5)** It is recommended that the County dedicate resources to engage and monitor changes at the utility level, or by the NCUC, that could support renewable energy development on an ongoing basis.

Near-Term

- **Solar leasing on County-owned land (B.1.)** It is recommended that the County explore opportunities to enter into solar leases with the utility or third-party developers.
- **Streamline permitting, inspection barriers and clarify zoning (A.2.)** In the near term, it is recommended that the County work with communities within Buncombe County to clarify and streamline processes for renewable energy development.
- **Work with other entities to install renewable energy through an aggregated procurement.¹¹⁴** As noted above, it is recommended that the County continue its effort to encourage local entities to install renewable energy as well, by creating an aggregated procurement process in which the sites

¹¹⁴ This action was not modeled, but stakeholders indicated that it is important and should be included within the actions.

would include County buildings/properties as well as community organization or commercial buildings in the County.

Medium-Term

- **Adopt legislation requiring renewable energy installations on new construction or during capital improvement projects County-wide where feasible.**¹¹⁵ In the medium-term, it is recommended that the County should consider a mandate for all new construction and major retrofits to include a renewable energy system.

Long-Term

- **Implement a revolving loan fund for residents and businesses.**¹¹⁶ Long-term, it is recommended that the County explore the capitalization needed to create a revolving loan program which would allow for residents to borrow capital for renewable energy projects and pay it back through cost savings.
- **Encourage residents and businesses to pursue renewable energy credits (RECs) (D.2.)** As more local options become available, it is recommended that the County provide residents and businesses with more information and resources on renewable energy purchase options such as renewable energy credits or power purchasing through Duke.

Limitations of this Analysis

Buncombe County's community-wide goal is a bolder goal, requiring state, and local community action for success. However, as noted above, changes at the state level or at the utility may help the community meet this goal by implementing measures that enable the local renewable energy market and increase renewables in current utility mixes.

This analysis does not include necessary changes to heating, cooling, transportation, and cooking fuels. The County and community will need to undertake an additional analysis to understand the efficiency conversions associated with fuel switching for these applications to renewable sources or electricity.

Finally, it is important to note that renewable energy cannot be considered in isolation without other forms of energy conservation technologies, such as energy efficiency, grid modernization, electric heating and cooling, demand-response, and storage. In addition to reducing overall energy usage and peak demand times, these mechanisms can support efforts in the renewable energy transition by increasing efficiency, reducing grid-demand, and overall energy demand.

¹¹⁵ This option was not modeled. However, it is similar in theory to action B.2., but broader in scope.

¹¹⁶ This option was not modeled. However, it is similar in theory to action B.4., but broader in scope.

Table 9: Buncombe County Potential Action Steps towards 2042

	Action	Type of Strategy	Implementing Departments	Activities of County	Types of Costs to the County	Support Needed
Actions Currently Undertaken	Solar leasing on County-owned land.	Near-Term	Procurement, Sustainability Office, County Attorney,	<ul style="list-style-type: none"> Identify potential sites for solar installations; Look at expected net savings from entering into a solar lease; Contract negotiation with utility or third party (in the future); 	Staff time, ongoing lease payments	Initial Negotiation Support
	Reduce permitting, zoning, and inspection barriers to Renewable Energy	Near-Term	Permitting & Inspections, Planning/Zoning, Sustainability Office	<ul style="list-style-type: none"> Identify ways to make zoning clearer for PV, and clarify permitting for developers (such as development of a permitting checklist) Identify best practices for solar permitting, inspection, planning; Engage in professional development trainings on best practices. Streamline the process where possible to reduce overhead. Provide best practices to other municipalities in the region. 	Staff time, trainings	Ongoing professional development and capacity building
	Lease County-owned property to utility for renewable energy development	Ongoing	Planning/Zoning, County Attorney, Finance, GIS, Procurement, Sustainability Office	<ol style="list-style-type: none"> Identify potential sites for leasing; Engage in discussions with electric utility on interest on solar PV development. Contract negotiation. 	Staff time	Initial Negotiation Support
Local Actions, Highly Feasible	Implement a Revolving Investment Program for renewable energy for residents	Long-Term	Finance, Facilities, Sustainability Office	<ol style="list-style-type: none"> Provide seed funding to the program; Create selection criteria or process for project prioritization. Select projects to fund. 	Staff time, capitalization of fund	Ongoing Management of Program
	Host a renewable bulk purchasing program (Solarize)	Ongoing	Procurement, Sustainability Office, County Attorney	<ol style="list-style-type: none"> Identify targets for the campaign (specific towns, commercial/residential entities) Form a partnership with local nonprofit to run the campaign(s); Develop and issue RFP; Bid review and analysis; Selection of bidders. Repeat campaigns every 2-3 years. 	Staff time, partnership funds (if any)	Initial negotiation support

Action	Type of Strategy	Implementing Departments	Activities of County	Types of Costs to the County	Support Needed
Adopt legislation requiring renewable energy installations on new construction or during capital improvement projects County-wide where feasible.	Medium-Term	County Commissioners, Sustainability Office, Facilities, Finance	Drafting legislation.	Staff Time	Capacity building resources and enforcement
Continue to engage the EITF to explore strategies related to incentive programs, utility programs, capital resources, establishing a Community Land Trust	Ongoing	Sustainability Office	Continue to work with the EITF to understand potential options and strategies related to renewable energy locally and at the utility level	Staff Time, Contractor Costs as Needed	Ongoing
Provide resources, tools and education to community members on renewable energy, energy efficiency, and transportation options; as well as resources for reducing energy use.	Ongoing	Sustainability Office, Community Engagement	<ul style="list-style-type: none"> • County can provide workshops, trainings and community meetings related to these topics. • County can provide a landing page on its website to house resources related to these topics, as well as link to relevant City/Town pages that are established; • County can establish community working groups related to these topics; • County can provide videos, webinars, social media posts, fliers, handouts on these relevant topics for residents and businesses. 	Staff Time	Ongoing
Work with area nonprofits and universities to establish workforce training and development for renewable energy	Ongoing	NC Works Career Center, Sustainability Office, Community Engagement	<ul style="list-style-type: none"> • Identify potential partner organizations focused on workforce development or renewable energy. • Identify potential needs within the community related to workforce development. • Provide resources to relevant entities through a partnership or through marketing support. 	Staff Time, Program Costs	Ongoing

	Action	Type of Strategy	Implementing Departments	Activities of County	Types of Costs to the County	Support Needed
	Work with other entities to install renewable energy through an aggregated procurement.	Near-term	Sustainability Office, Facilities, Finance, Procurement	<ol style="list-style-type: none"> 1. Identify potential entities within the County; 2. Develop and issue RFP; 3. Bid analysis and selection; 4. Contract negotiation; 5. Construction; 6. Operations and Maintenance. 	Staff time, capital costs, operations and maintenance	Ongoing operations and maintenance
Alternative Purchasing Options	Encourage residents and businesses to pursue renewable energy credits (RECs)	Long-term	Sustainability Office, Finance, Procurement, County Attorney	<ol style="list-style-type: none"> 1. Provide information on County website; 2. Post through marketing channels and social media; 3. Have workshops with potential participants 	Staff time, Capital costs	Initial capital support
	Dedicate staff time and resources to monitoring and engaging in conversations on state-level policies	Long-Term	Sustainability Office	<ul style="list-style-type: none"> • Identify staff that can engage in renewable energy policy conversations and relevant opportunities to do so. Specific policies of interest may include those related to: 	Staff Time, Contractor Costs as Needed	Ongoing
State, Utility, Community Engagement	Dedicate staff time and resources to monitoring and engaging in conversations on utility policies	Long-Term	Sustainability Office	<ul style="list-style-type: none"> • Continue work with the EITF, and local utilities, to identify ways for utilities to support Buncombe County's goals; 	Staff Time, Contractor Costs as Needed	Ongoing

Appendix A

Policy Analysis Matrix

This Appendix provides details of the policy analysis conducted for each of the 22 potential strategies.

Evaluation Criteria

Each strategy was rated qualitatively (from Low to High, or from Negative to Positive) on several criteria:

- **Precedence for the strategy in Buncombe County and the City of Asheville.** This was also included in the analysis to highlight whether the County or City have already enacted a similar strategy or had plans to do so. This helped highlight policies that were identified in Pathway A – strategies already implemented or planned by the County and/or City.
- **Potential Scale of Impact (Low to High).** The potential scale of impact that a strategy is expected to have on the municipal or county-wide energy mixes was assessed on a scale of Low to High with low meaning the impact was minimal on the overall electricity mix, and high meaning that there was a substantial impact on the electricity mix. For example, distributed generation was ranked low because even if solar panels were installed on all municipal buildings, it would increase the County-wide electricity mix by about 15 percent. Meanwhile, major state-level policy actions would have a higher impact because they could lead to action throughout the state.
- **Potential Financial Impact (Low to High).** The potential financial impact that a strategy is expected to have on the County and City in terms of cost to implement was rated from low to high, with low meaning that the strategy has a limited upfront or ongoing cost associated with it (or produces savings), and high meaning that the strategy has significant upfront or ongoing costs.
- **Potential Feasibility (Low to High).** The potential feasibility of each strategy was ranked from low to high and is intended to show how achievable the strategy is considering burden on staff, policy barriers and political will, and technical barriers. High feasibility indicates that there are few barriers to implementation (i.e., there are low costs, it is technologically possible, and there is limited or no political opposition), while low feasibility means that it will be difficult to implement the strategy due to one or more barriers.
- **Potential Equity Impacts (Negative to Positive).** The potential equity impacts of each strategy were ranked from negative to positive and refer to the distributional effects of the benefits and harms associated with strategy. This includes the distributional impacts of renewable energy availability, cost savings, local public health, and workforce development. For example, community shared solar would have a positive equity impact because it improves access to renewable energy cost benefits to citizens who may not otherwise be able to install their own solar PV systems (i.e., renters; LMI community members).
- **Potential Environmental Impacts (Negative to Positive).** The potential environmental impacts of each strategy were ranked from negative to positive and refer to the environmental benefits and harms associated with the strategy. This includes impacts on resiliency, land use, emissions and conservation. A positive ranking indicates that the strategy should cause overall benefits to the environment and a negative ranking indicates that the overall impact to the environment will be negative.
- **Potential Local Impacts (Low to High).** The potential local impacts of each strategy illustrate whether the scenario will have a positive local impact (such as local renewable energy generation within City and County limits) and the ability of the strategy to improve the County and City's role as a leader. A

low rating means that the scenario does not occur locally or has limited local impacts (i.e., RECs) and a high rating means that the scenario occurs within the County or City and generates local benefits and promotes the County and City as leaders in transitioning to renewable energy.

Pathway A Strategies

A.1 On-site generation – locally owned

Strategy Description: Install renewable energy (RE) projects on County/City-owned facilities and lands where the County/City would own the project(s) and the Renewable Energy Credits (RECs). North Carolina (NC) has a specific net metering sizing program that enables the County/City to own a behind-the-meter facility and use that generation, but it does not carry over from month-to-month.

Table A.1. Policy Detail; On-site Generation

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	The City is in the process of adding a 65-kW solar array to a transit station and the County is in the process of adding 5 MW of solar arrays to the County landfill.
Potential Scale of Impact	Low – Municipal facilities may be limited in on-site space to host Renewable Energy (RE) projects. County/City facilities account for a small percentage of the County/City building and land stock. The impact on municipal goals will be somewhat higher than on County goals because the amount of RE needed to cover municipal energy consumption will be less than what is needed to cover County energy consumption.
Potential Financial Impact	Medium – On-site generation will incur upfront costs, but the County/City should see savings over time.
Potential Feasibility	Medium – On-site generation will require staff time to administer and may face some technical and bureaucratic barriers internally and during the interconnection process with the Duke power grid, which currently has a backlog in the interconnection queue . However, this strategy is legally feasible, appears to have strong community support and, once all parties agree, is a relatively simple process to implement.
Potential Equity Impacts	Neutral – On-site generation has an overall neutral equity impact because while local generation improves local air quality, provides workforce development opportunities (although somewhat limited due to scale) and distributes energy to the County/City and local grid, it does not actively address inequities in energy costs and burdens. This assessment also assumes that the County/City are able to achieve on-site generation without raising taxes or otherwise burdening low-medium-income (LMI) communities.
Potential Environmental Impacts	Positive - On-site generation should have an overall positive impact on the environment because installation of DER can improve resiliency and reduce emissions and improve air quality, assuming that onsite generation is developed on existing buildings or brownfields rather than greenfields.
Potential Local Impacts	High - Onsite generation on County and/or City facilities or grounds would qualify as local renewable energy, and would help the County and/or City to be a leader for North Carolina.

DRAFT

A.2 Reduce permitting, zoning, and inspection barriers to renewable energy

Strategy Description: The County and City streamline the permitting, zoning, and inspection processes so that processing time and expenses are reduced. This may include streamlining permitting processes for specific technologies that meet certain standards and eliminating redundancies from inspection protocols.

Table A.2 Policy Detail; Reduce permitting, zoning, and inspection barriers to renewable energy

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low-Medium – Reducing permitting, zoning, and inspection barriers has the potential to increase the level of renewables in the County/City energy mix by reducing the soft costs associated with the development of on-site renewable energy systems but would not be transformative in itself.
Potential Financial Impact	Low – Reducing permitting, zoning, and inspection barriers may incur some implementation costs for the County/City, but hopefully would generate savings due to reduced staffing requirements and expediting development.
Potential Feasibility	Medium – Although reducing permitting, zoning, and inspection barriers to renewable energy will likely incur some upfront cost and staff time to design and implement, overall this strategy should create new efficiencies. Some political and/or technical barriers may be expected during the implementation phase but may be overcome if overall efficiencies are viewed as worthwhile.
Potential Equity Impacts	Neutral – Reduced procedural barriers theoretically helps everyone install solar with more ease, but in effect does not explicitly help provide access to those who otherwise cannot afford solar, and could encourage more wealthy residents to install since they already are more able to cover the expense.
Potential Environmental Impacts	Positive – Reduced permitting, zoning and inspection barriers have an overall positive environmental impact due to the reduced emissions that accompany any solar development, so long as such solar development also limits greenfield development
Potential Local Impacts	High – Reducing permitting, zoning and inspection barriers creates an enabling environment for the installation of onsite renewable energy projects within the County and City.

A.3 Lease County/City property for renewable energy development

Strategy Description: The County/City offers to lease its rooftops and other available real property to utilities or developers to host renewable energy projects. Developers would likely retain cost-savings and REC benefits, but the strategy would increase the amount of locally produced RE in the jurisdiction and provide a revenue stream to the County/City through lease payments.

Table A.3 Policy Detail; Lease County/City property for renewable energy development

Topic	Research and Analysis Highlights
Precedence in Buncombe	N/A

County and the City of Asheville	
Potential Scale of Impact	Low – Municipally owned facilities and properties may be limited in on-site space to host RE projects. County/City facilities account for a small percentage of the County/City building and land stock. The impact on municipal goals will be somewhat higher than on County goals because the amount of RE needed to cover municipal energy consumption will be less than what is needed to cover County energy consumption.
Potential Financial Impact	Low – Leasing County/City property to utilities or developers for renewable energy projects has the potential to, depending on the terms of the leasing agreement, generate revenue or cost savings for that property.
Potential Feasibility	High – Leasing of County/City property is not likely to place a significant burden on staff but is subject to policy barriers and political will. The Municipal Operations Advisory Group expressed interest in maximizing County/City lease space for renewable energy projects.
Potential Equity Impacts	Positive – Leasing County/City property is likely to generate workforce development opportunities and reduce emissions. However, the location of County/City facilities may not be equally distributed throughout the jurisdictions and/or may not be located in outlying communities.
Potential Environmental Impacts	Positive – Leasing County/City property for RE projects is expected to have a positive environmental impact due to reduced emissions.
Potential Local Impacts	High - Leasing County/City property for RE projects requires the installation of such projects within the County/City jurisdiction. This means that projects will occur locally, which provides local benefits and elevates the status of the County/City as a renewable energy leader.

Pathway B Strategies

B.1 On-site generation - leased

Strategy Description: Generation capacity is installed on County/City property, but the County/City leases the renewable energy system (likely solar PV) from a developer at a fixed price per month for the RE generated by the system, rather than owning the system. The County/City would be able to use the renewable energy generated by the leased system to offset some or all of their utility-based energy consumption.

Table A.1 Policy Detail; On-Site Generation - Leased

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	Solar leasing has been recently allowed in NC.

Potential Scale of Impact	Low – Municipal facilities may be limited in on-site space to host RE projects. County/City facilities account for a small percentage of the County/City building and land stock. The impact on municipal goals will be somewhat higher than on County goals because the amount of RE needed to cover municipal energy consumption will be less than what is needed to cover County energy consumption. Additionally, leasing for nonresidential solar is capped at the lesser of 1 megawatt (MW) or 100 percent of contract demand, although this may not be a concern for the County/City.
Potential Financial Impact	Low – Use of a Solar Lease (or a PPA, if it were eventually allowed in NC) will eliminate the high upfront costs usually associated with installing a PV system, and the County/City would receive a lower fixed rate for the electricity generated by the PV system(s).
Potential Feasibility	Medium-High – On-site generation that is not owned by the County/City should be more feasible because the technical and staff capacity barriers will be lower than in a traditional ownership model, since the PV system will belong to (and be maintained by) a third party. However, political will may decrease if it is important that the County/City owns the RECs. Additionally, it is important to consider that leasing for nonresidential is capped at the lesser of 1 MW or 100 percent contract demand (cannot offset more than 100 percent of lessee's retail energy consumption)
Potential Equity Impacts	Positive – On-site generation would improve local air quality and may provide opportunities for workforce engagement (although somewhat limited due to scale) and RE would be distributed to the local grid even though the County/City would not technically own that energy in terms of RECs. This positive rating assumes that the cost savings gained by the County/City (and resulting benefits) will be distributed equitably to the public.
Potential Environmental Impacts	Positive - On-site generation should have an overall positive impact on the environment because installation of distributed energy resources like solar PV can improve resiliency, reduce emissions and improve air quality, assuming that onsite generation is developed on existing buildings or brownfields rather than greenfields. The fact that the generation would not be owned by the County/City does not change these environmental impacts.
Potential Local Impacts	High - onsite generation on County/City facilities or property would qualify as local renewable energy, and would help the County / City to be a leader for North Carolina. The fact that the generation would not be owned by the County/City does not change these local impacts, unless part of the leadership factor is negatively impacted if the RECs are owned by a third party. This may also depend on who the third party is (duke or a local third-party vs an out-of-state third party).

B.2 Local renewable energy requirements

Strategy Description: The County/City adopts legislation that requires renewable energy installations on all County/City owned property during new construction or major renovations.

Table B.2 Policy Detail; Local renewable energy requirements

Topic	Research and Analysis Highlights
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Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low – Municipal facilities may be limited in on-site space capacity to host RE projects. County and City facilities account for a small percentage of the County/City's building and land stock. Impact for municipal goals will be a bit higher because the amount of RE needed to cover municipal energy consumption will be less than what's needed to cover county-wide energy consumption.
Potential Financial Impact	Medium – Requiring the installation of renewable energy on County/City property without the use of a Solar Lease will require the use of local funds to pay for the installation of those PV systems. However, installation of such a system would reduce the rate paid for electricity and generate savings in the long-term.
Potential Feasibility	Medium – Adopting legislation requiring renewable energy installations on County/City owned property during new construction or major renovations is not likely to place a burden on staff, but implementation of such legislation would likely implicate bureaucratic, technical, and financial barriers that would need to be overcome. Additionally, the County/City would need to work with Duke to interconnect the projects to the grid, and there is currently a backlog in the interconnection queue.
Potential Equity Impacts	Positive – Requiring renewable energy installations on County/City owned property during new construction or major renovations would improve air quality and could generate workforce development opportunities (although somewhat limited due to scale). RE energy would be distributed to the local grid, which the County/City may or may not own—depending on finance model, but savings gained could be equitably redistributed to the public.
Potential Environmental Impacts	Positive - Requiring renewable energy installations on County / City owned property during new construction or major renovations would generate a positive environmental impact due to reduced emissions and improved air quality, assuming all new construction takes place in previously developed areas or brownfields rather than greenfields.
Potential Local Impacts	High - Establishing onsite generation requirements for new construction or major renovation projects on County/City owned property would qualify as local renewable energy, and elevate the County/City 's status as a leader in RE utilization for North Carolina.

B.3 Support a renewable energy bulk purchasing program

Strategy Description: The County/City supports solarize campaigns to expand solar capacity.

Table B.3 Policy Detail; Host a renewable energy bulk purchasing program (solarize campaign)

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	Solarize Asheville helped to facilitate the installation of 251 kilowatt (kW) through 52 contracts in Asheville in 2013.
Potential Scale of Impact	Low-Medium – Continued support of Solarize Asheville and support of other or new campaigns could increase the County/City's energy mix of small-scale solar (overall smaller impact on total energy mix) by overcoming acquisition costs, spurring market development, and educating communities about renewables.
Potential Financial Impact	Low – Supporting solarize campaigns to expand solar capacity throughout the city is not anticipated to require much expanded staff or operational capacity.
Potential Feasibility	High – The City of Asheville has successfully supported local Solarize campaigns and should be able to do so with minimal burden on staff or bureaucratic or technical barriers.
Potential Equity Impacts	Neutral – Solarize campaigns educate communities about renewable energy, and bulk purchasing reduces the costs of acquiring solar for customers. However, cost reductions from bulk purchasing may not be enough to be fully inclusive of all residents of Buncombe County. Bulk purchasing would likely generate some workforce development opportunities.
Potential Environmental Impacts	Positive – solarize campaigns and bulk purchasing help increase the amount of RE that is developed in the community, which results in lower emissions and related environmental benefits. Increased distributed energy resources (DER) throughout the community can also improve community resilience if fewer residents are dependent upon the utility's electric grid.
Potential Local Impacts	High - Supporting bulk purchasing and solarize campaigns has elevated the renewable energy generation profile of the County/City and continuing to do so would further this.

B.4 Establish a revolving investment fund for municipal renewable energy projects

Strategy Description: The County/City establishes a revolving fund where proceeds from existing RE projects are reinvested into new RE projects. The money would have to either come from operating funds (since municipalities in North Carolina cannot borrow money to lend out) or the County/City could support a green bank or similar alternatives at the state level.

Table B.4 Policy Detail; Establish a local revolving loan fund

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A

Potential Scale of Impact	Low-Medium – Establishing a revolving fund would support the expansion of RE projects throughout the County/City. However, the scale would depend on how much funding was made available to start the fund and at what rate it was lent out.
Potential Financial Impact	High – While some revolving funds are federally supported, the County/City should anticipate needing to allocate funds from the general budget. Once operational, however, the program would be self-sustaining.
Potential Feasibility	Medium – Establishing a revolving fund is likely to face technical barriers and place a burden on staff. Political and bureaucratic barriers will depend on the funding source for the development and maintenance of the fund.
Potential Equity Impacts	Positive – The County/City could design such a fund with equity in mind by focusing on specific areas or specific technologies that need financing. This could help to address existing inequities in energy costs and burdens.
Potential Environmental Impacts	Neutral – While projects resulting from a fund supporting RE projects would reduce emissions, it is difficult to predict what the overall environmental impact of the program would be since the program’s success is based on a variety of other external factors.
Potential Local Impacts	High – a County/City established revolving fund would result in local RE projects and demonstrate leadership by the County/City in developing RE.

Pathway C Strategies

C.1 State mandate to install renewable energy and energy efficiency on all new buildings and all capital improvement projects

Strategy Description: The State would enact legislation that requires new development and capital improvement projects to meet certain renewable energy (RE) and energy efficiency (EE) standards.

Table C.1 Policy Detail; Create mandates to install renewable energy and energy efficiency on all new municipal buildings and all capital improvement projects

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Medium – The state-level requirements would impact all new development and capital improvement projects, but would not apply to existing buildings that do not require major capital improvements.
Potential Financial Impact	Medium – As a state-level initiative, the costs to work with the state to enact such a law the County/City would be low. Once enacted, there would be significant costs associated with complying with the law.
Potential Feasibility	Low – The County/City has the ability to influence state-level policy, but not determine its course. County/City staff may be burdened by the adoption of such a measure due to the need to increase capacity for enforcement and potential technical limitations. However, as a state-level initiative that supersedes

Potential Equity Impacts	County/City bureaucracy, there are no perceived political will barriers at the local level. Neutral-Negative – While the overall impacts on such legislation are anticipated to be positive, it is possible that such state-wide mandates may negatively impact the development of LMI housing due to increased building costs. If such state-wide requirements were adopted, the County/City should seek to develop programs and incentives to mitigate potential adverse effects to affordable housing.
Potential Environmental Impacts	Positive – The environmental impact should be positive because new buildings and buildings that undergo capital improvements will have a decreased carbon footprint. This assumes that such requirements do not inspire new developments that would negate environmental conservation practices on greenfields.
Potential Local Impacts	Medium – State legislation requiring new development and capital improvement projects to meet certain RE and EE standards would likely have a significant local impact, but would depend on the rate of development of new buildings and capital improvement projects within the County and City. Additionally, as a state-wide policy, there would be more limited opportunity for the County and City to distinguish themselves as leaders in this area.

C.2 Increase state and utility renewable energy and energy efficiency portfolio standard

Strategy Description: Increase North Carolina's existing renewable energy portfolio standards (REPS) to a higher standard through state legislation.

Table C.2 Policy Detail; Increase state and utility renewable energy and energy efficiency portfolio standard

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	NC already requires all investor-owned utilities in the state to supply 12.5 percent of 2020 retail electricity sales in the state from eligible renewable energy sources by 2021. Up to 25 percent of this requirement may be met through energy efficiency technologies, including combined heat and power systems powered by non-renewable fuels.
Potential Scale of Impact	High – An increased state REPS would increase the level of renewables in the County/City's energy mix and reduce carbon emissions as the increased proportion of renewables would occur at a city-wide scale.
Potential Financial Impact	Low – The County/City is not expected to share in the costs that would be incurred by the State to implement such a legislative change.
Potential Feasibility	Low – Energy Innovation Task Force (EITF) members have expressed concern about bringing up increasing the REPS in the legislature due to lack of political will to increase the REPS, and the fear that bringing it up would make it subject to elimination. It is possible that the political balance could shift in favor of this policy after the 2020 elections.
Potential Equity Impacts	Neutral – Although increasing the REPS could have a positive equity impact because it would equally incentivize RE and should generate cost savings that could be equally distributed through the county/city, this strategy does not actively address inequities in energy costs and burdens.

Potential Environmental Impacts	Positive - Increasing the REPS would have a positive environmental impact by increasing the amount of RE and EE in the state, which would cause a reduction in emissions, and would increase resilience through a further diversified energy mix.
Potential Local Impacts	Medium – As a state policy, this would have broader impacts than strictly within the County and City. However, as a result of such a state policy, the County/City should experience an increase in RE and EE, both through local actions and through the utility, since the utility would also be required to change its energy supply mix to comply with the law.

C.3 Enhance the third-party ownership framework to allow Power Purchase Agreements

Strategy Description: Enhance the North Carolina solar leasing framework by expanding Duke's procurement requirements, and/or allowing third party PPAs, both of which require state legislation. This would provide additional options and flexibility to entities interested in purchasing solar energy.

Table C.3 Policy Detail; Enhance third party ownership framework to allow Power Purchase Agreements

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	Solar leasing is newly allowed in NC and Duke is required to procure 2,660 MW of RE over a 45-month period through a competitive procurement of RE process. Third Party ownership (PPAs) are not yet permitted.
Potential Scale of Impact	Low-Medium – Enhancing NC's solar leasing framework by expanding Duke's procurement requirements or by allowing third-party PPAs has a potential scale impact of Low-Medium because it would make the process of solar procurement easier but would not be transformative in itself.
Potential Financial Impact	Low – The County/City is not expected to share in the costs that would be incurred by the State to implement such a legislative change
Potential Feasibility	Medium – The State recently enacted a policy requiring Duke Energy to support a certain amount of third-party energy and may lack political will to expand this policy in the near-term. Continued progress on this policy option likely will not happen unless there is a political shift in the future.
Potential Equity Impacts	Neutral-Positive – Third-party ownership could greatly improve the accessibility of on-site renewable energy systems for the County/City and its residents and businesses if designed to be inclusive and affordable.
Potential Environmental Impacts	Positive-Neutral - Enhancing the third-party ownership framework would have a positive environmental impact by increasing the amount of RE development. However, these environmental benefits may not be felt directly within the County if the project(s) are located elsewhere.
Potential Local Impacts	Medium – As a state-level policy impacting Duke Energy, there may be increased RE generation locally within the county, but some RE projects that the county is able to purchase renewable energy from may be located in a remote location. Additionally, there are no direct impacts to the County / City's position as a leader for renewable energy in the State.

C.4 Implementing a State Green Bank

Strategy Description: Establish a Green Bank at the state level via legislation to develop innovative partnerships between private and public finance. A state green bank could help fund investments in clean energy technology in Buncombe County by providing credit enhancements and low-cost loans to residents and businesses, which would help to develop the County’s renewable energy market.

Table C.4 Policy Detail; Establish a Green Bank

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low – A state-level green bank would provide opportunities to the broader community in the County, but would rely on individuals seeking out the opportunity to utilize benefits from the bank to increase RE within the County. Impact would also be limited by the amount of capital available for deployment.
Potential Financial Impact	Low-Medium – Implementing a state green bank would require capitalization entities across the state, including the County and City. While there would be an upfront cost, the County and City’s share would likely be a relatively small percentage of the entire capitalization necessary.
Potential Feasibility Impact	Medium – Because this would be implemented at the state level, feasibility at the County/City level will rely primarily on whether necessary funding can be provided for capitalization.
Potential Equity Impact	Neutral-Positive – Theoretically available to those who would like to participate, but participation could be constrained by awareness and credit barriers. A green bank could have a positive equity impact if its programs are tailored to provide affordable access to capital for low- and moderate-income households.
Potential Environmental Impact	Neutral to Positive – While this program does not directly impact the environment, successful implementation of the program leads to increased renewable energy development, which has positive environmental benefits.
Potential Local Impact	Medium – This program is ranked medium for local impact because it is implemented by the state but would likely result in renewable energy development within the County/City.

C.5 Enable and support community / shared solar projects

Strategy Description: Organize community / shared solar projects in which multiple utility customers can subscribe to community solar and benefit from lower rates.

Table C.5 Policy Detail; support community / shared solar projects

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	In NC, recent legislation requires Duke Energy to offer 40MW of community solar. The existing program allows participants to get electricity from community solar at Duke's avoided cost rate but currently has some barriers to entry for the program.

Potential Scale of Impact	Low – Organizing community or commercial solar projects is projected to be limited in scale due to the limited control that the County/City has over community solar energy. Additionally, while recent legislation requires Duke Energy to offer 40MW of community solar, it is unclear how much of that will be located in the County/City.
Potential Financial Impact	Low – Organizing community or shared commercial solar projects is not anticipated to be a cost to the County/City as there is no need to increase staff or operational capacity to do so.
Potential Feasibility	Low-Medium – The feasibility of organizing community or commercial solar projects is projected to be low due to the limited control that the County/City has over community solar energy, and the high barriers that exist for participation currently. While recent legislation requires Duke Energy to offer 40MW of community solar, it is unclear how much of that will be located in the County/City and the implementation of the program will likely be delayed until 2021.
Potential Equity Impacts	Positive – The ability of the County/City to host community RE projects and promote community solar programs among residents is unclear, but the equity impacts would be positive if implemented as they would enable participating members to enjoy the economic and environmental benefits of solar.
Potential Environmental Impacts	Positive – If effectively implemented, community shared solar would help increase the amount of renewable energy in the community, which has positive environmental impacts of reduced emissions, improved air quality, and increased resilience.
Potential Local Impacts	High - Community or shared commercial solar projects would be built within the community, having a direct impact on local emissions and would provide benefits locally. This would also improve the status of the County/City as a renewable energy leader.

Pathway D Strategies

D.1 Renewable Energy Credit-based purchasing by County and/or City

Strategy Description: The County and City incorporate RECs into renewable energy purchasing practices as an accounting method to facilitate the realization of state-level energy targets.

Table D.1 Policy Detail; Renewable Energy Credit-based purchasing by the County and/or City

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	High – Purchasing RECs theoretically could cover the County/City's entire RE needs, so the potential scale of impact is high for reaching the municipal goals, and Medium for reaching the Community-wide goals.
Potential Financial Impact	Medium-High – The County/City would incur financial costs to purchase RECs, although the overall impact would depend on how many RECs were actually purchased.

Potential Feasibility	Medium-High – The political barriers to expending significant financial resources to purchase RECs would likely impact the overall feasibility of this strategy.
Potential Equity Impacts	Negative – RECs purchased by the County/City may divert or reallocate funds from other local gov't programs, including those for low income populations or affordable housing.
Potential Environmental Impacts	Neutral to Positive - Supporting RE beyond the county through REC purchasing still creates environmental impacts of lowered emissions and improved air quality, but these impacts may not be felt directly in the county if the project from which the RECs are purchased is located elsewhere.
Potential Local Impacts	Low - Local benefit will depend on where the RE projects that generate the RECs are located. Large scale RE is likely to be located outside of the county or state, and therefore local impacts are likely to be limited.

D.2 Renewable Energy Credit-based purchasing by residents and businesses

Strategy Description: Residents and businesses incorporate RECs into renewable energy purchasing practices as an accounting method to facilitate the realization of state-level energy targets.

Table D.2 Policy Detail; Renewable Energy Credit-based purchasing by residents and businesses

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	High – Purchasing RECs theoretically could cover the RE needs of the entire County, so the potential scale of impact is high.
Potential Financial Impact	Medium-High – Residents and businesses would incur financial costs to purchase RECs, although the overall impact would depend on how many RECs were actually purchased.
Potential Feasibility	Medium – Purchasing RECS is very feasible in itself and it is possible for any entity to purchase RECs. However, it may not be of interest, may be too costly, or may be too complicated, for many residents and businesses to engage in. This limits the overall feasibility of this strategy.
Potential Equity Impacts	Negative – RECs purchased by residents or businesses would be limited to those who could afford to do so, rather than all residents / businesses.
Potential Environmental Impacts	Neutral to Positive - Supporting RE beyond the county through REC purchasing still creates environmental impacts of lowered emissions and improved air quality, but these impacts may not be felt directly in the county if the project from which the RECs are purchased is located elsewhere.
Potential Local Impacts	Low - Local benefit will depend on where the RE projects that generate the RECs are located. Large scale RE is likely to be located outside of the county or state, and therefore local impacts are likely to be limited.

D.3 Purchase renewable energy through Duke Energy Progress

Strategy Description: Large, non-residential customers can procure renewable energy through DEP’s Green Source Advantage Program (GSA) once it the program been approved by the NCUC. With a total capacity of

600 MW, this program allows DEP customers to select a renewable energy developer and negotiate contract length and price terms for the energy and the associated RECs directly with the developer. The developer enters into a PPA with DEP for the energy transferred to DEP’s grid, and the customer receives RECs and a GSA bill credit on their monthly bill from DEP.¹¹⁷

Table D.3 Policy Detail; Partner with the utility to procure renewable energy.

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	The Green Source Advantage Program was enacted by state law and is currently under review at the NCUC.
Potential Scale of Impact	Low – partnering with DEP to procure renewable energy increases the development of renewable energy within the County at the community level. While the overall program capacity is quite large, it should be expected that only a small percentage of that capacity will be allocated to commercial customers within the County.
Potential Financial Impact	Low – this project should not require the payment of any costs from the County or City, since it is a utility program that exists for commercial customers. Commercial customers within the County will benefit from lower renewable electricity rates.
Potential Feasibility Impact	High – This initiative is currently under review by the NCUC and seems on track to be running within the near future. There are no substantial anticipated barriers that affect feasibility from the County/City
Potential Equity Impact	Neutral-Negative – This program does not specifically address equity and may favor commercial entities with the time and resources to work with DEP to participate in this program, especially because the program has a limited capacity for participation.
Potential Environmental Impact	Neutral-Positive – This program does not directly create environmental benefits, but successful implementation of the program in the County will lead to increased renewable energy generation, which has environmental benefits such as reduced emissions and improved air quality.
Potential Local Impact	Medium – Green Source Advantage is a utility program and should impact a broader territory than the County/City. If commercial customers within the County/City are able to participate in the program, it will increase the amount of renewable energy for the Community-wide goal.

Energy Innovation Task Force Actions

E.1 Establish local renewable energy non-financial incentive programs

Strategy Description: The County/City establish programs to incentivize renewable energy for residents and businesses. Such programs could include density bonuses for renewable energy installations on new construction, or local competitions where the primary incentive would be public recognition of achievement.

¹¹⁷ Duke Energy Progress (2019). Green Source Advantage Program. Available at: <https://www.duke-energy.com/business/products/renewables/nc-green-source-advantage#tab-cb6d14f8-3824-4030-9f77-46a0662ec6a4>

Table E.1 Policy Detail; Establish local renewable energy non-financial incentive programs

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low –Voluntary action by individual residents or businesses is unlikely to generate large quantities of RE, however, such a program will generate more awareness among community members and may support the building of a culture supportive of renewables.
Potential Financial Impact	Low – Operating a RE program centered on public recognition and achievement is not anticipated to cost the County/City much. Costs may include the development and management of a competition specific webpage and outreach (e.g., media campaign).
Potential Feasibility	High – Such a program is expected to require limited staff capacity and to be well received across County/City government, facing few soft barriers to implementation. Technical barriers are also expected to be minimal but will depend on the type’s technologies leveraged and program design.
Potential Equity Impacts	Neutral – Although non-financial incentive programs will be open to all, a competition program favors those individuals and businesses who have the time and resources to participate (including possibly developing RE independently), and the recognition will be exclusive to those participants. The County/City could improve equity by designing additional incentive programs that can be more inclusive, such as tying this to education about Duke's solar rebates.
Potential Environmental Impacts	Neutral-Positive – this program in itself is aimed at incentivizing community action rather than environmental benefits. However, if successful, increased renewable energy generation will have positive environmental impacts.
Potential Local Impacts	High - The nature of a local, public recognition event suggests that impacts will have a positive impact within the County/City. Additionally, developing and operating such a program would elevate the County/City's position as a leader for renewable energy in North Carolina.

E.2 Increase municipal taxes to raise revenue for renewable energy projects

Strategy Description: Increase municipal taxes (e.g., sales or property) or create a new tax (e.g., tourism tax, carbon tax) to raise revenue to fund RE projects.

Table E.2 Policy Detail; Increase municipal taxes to raise revenue for renewable energy projects

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low – Raising municipal taxes to support RE projects could generate significant funding to rapidly upscale RE measures throughout the County/City, but this

Potential Financial Impact	would still represent a fraction of the overall energy mix without a more radical shift in utility regulation. Low – The administrative cost of raising taxes for the County/City is relatively low as the taxation framework is already in place. Once the tax is in place, the County/City will receive additional revenue with which to fund RE projects.
Potential Feasibility	Low – A low appetite for raising taxes has been reported among workshop participants and local government employees.
Potential Equity Impacts	Dependent on Approach – The impact of a tax depends on what goods and/or services it targets, if there are alternatives (e.g., gas tax and mass transit), whether it is a prog/regressive tax, and its value. The County/City could create equity impacts, but the impact-fullness will depend on approach.
Potential Environmental Impacts	Neutral - A tax to fund RE projects would likely result in the reduction of emissions, but the greater environmental impacts depend on a range of other factors not tied to taxation (e.g., land use regulations).
Potential Local Impacts	High - Raising a local tax to fund local RE projects would have a significant impact on the local landscape, reflecting the costs of emissions while financing public facing RE projects.

E.3 Establish a community land trust to support renewable energy projects

Strategy Description: A community group would acquire land and place it in trust that restricts land use to RE purposes.

Table E.3 Policy Detail; Establish a community land trust to support renewable energy projects

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low – Purchasing land within the County/City and restricting uses to RE purposes is anticipated to have a low impact due to limited availability of land and cost of acquisition.
Potential Financial Impact	Low – The County/City is not expected to incur any costs associated with a community group purchasing land that restricts land use to RE purposes.
Potential Feasibility	Medium – Such a community project would be beyond the direct control of the County/City and therefore would not be subject to the same political and financial barriers that might otherwise apply. Feasibility would be dependent on factors related to the community group and relevant RE policy at the state or local level.
Potential Equity Impacts	Positive to Neutral – Acquiring land to support the development of RE could generate local public health benefits and workforce development opportunities. Cost savings and RE availability would depend on the size of the land and scale of the project.
Potential Environmental Impacts	Depends on Approach – Any development of RE has environmental benefits of decreased emissions and improved air quality. From a land-use perspective, environmental impacts depend on where the project is developed. If the land was

Potential Local Impacts	<p>a brownfield or similar site, the environmental impacts would be positive. However, if the land was a greenfield site the benefits would be greatly diminished.</p> <p>High - Assuming any community land trust does occur within the County or City, resulting RE projects would be considered local and should provide local benefits. Additionally, the County/City's position as a RE leader in North Carolina would depend on their role in supporting such a project.</p>
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E.4 Create utility-owned or on-bill-financed rooftop solar programs

Strategy Description: Collaborate with Duke to institutionalize monthly compensation to customers (on-bill financing) for hosting a utility-owned rooftop solar project, creating enduring and consistent incentives.

Table E.4 Policy Detail; Create utility-owned or on-bill-financed rooftop solar programs

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	Duke's Green Source Advantage program is available to nonresidential customers w/ at least 1 MW of peak energy demand at a single location, or an aggregate of 5 MW or more of peak demand across multiple locations. Customers would enter into an agreement with Duke Energy Progress to procure RE and would have the opportunity to choose their preferred supplier. The customer would be able to acquire RECs generated by a renewable facility located in the same service territory but would not receive RE energy and capacity.
Potential Scale of Impact	Low-Medium – The current Green Source Advantage program that creates an on-bill financing program is somewhat limited. A more expansive on-bill financing program could make it easier for utility customers to procure RE. However, the overall scale is limited because it does not represent a radical shift in utility regulation and would only account for a fraction of the overall power mix.
Potential Financial Impact	Low – The County/City may incur some costs to collaborate with State and utility partners, but overall the implementation cost would be DEP's responsibility.
Potential Feasibility	Low-Medium – Duke has publicly stated that on-bill financing cannot be offered until after its new billing system (Customer Connect) is installed. For DEP, this will likely occur in 2021.
Potential Equity Impacts	Neutral-Positive – Equity impacts will depend on the ultimate design of the on-bill program. Equity may be more limited if only certain people can qualify to use the program, but it is possible that a program could be more inclusive and equitably distribute RE availability, cost savings, local public health, and workforce development
Potential Environmental Impacts	Positive -Neutral - Creating an effective on-bill financing program would incentivize investment in RE projects, which would create environmental benefits of reduced emissions and improve air quality. However, these environmental benefits may not be felt directly within the County if the project(s) are located elsewhere.
Potential Local Impacts	Medium - The current program only allows for customers to purchase RECs, which could limit local impact if projects are located beyond the county. It is possible that projects would be located within the state or county though, under the current or an improved program, so local impacts could be felt depending on those circumstances.

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E.5 Engage the utility in achieving energy goals by building government-utility relationships

Strategy Description: Engage Duke through the EITF to collaboratively set energy goals or engage in docket proceedings to influence utility behavior.

Table E.5 Policy Detail; Engage the utility in achieving energy goals by building government-utility relationships

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	Local government currently engages with DEP through the EITF.
Potential Scale of Impact	Low – Although policies that could result from this relationship could have a broad scale of impact, this strategy aims to expand upon the County/City’s working relationship with DEP but does not provide a not a direct path connecting utility engagement to energy impact. Therefore, it is rated as having a low scale of impact.
Potential Financial Impact	Low - The cost of engaging DEP in goal setting and continuing to participate in relevant dockets at the NCUC would require staff time but would probably not require the County/City to hire additional staff.
Potential Feasibility	Medium - It is expected that the County/City would not face substantial financial, staff, or political barriers to continuing or increasing its engagement with DEP and state level actors to improve policies and drive market growth for the state and the County/City. The feasibility of success in getting the state and/or DEP to agree with the County/City and make desired changes is lower, but dependent on political and financial factors at that level.
Potential Equity Impacts	Neutral-Positive – Engaging Duke Energy in setting renewable energy goals could facilitate the development of measures to improve renewable energy access to underrepresented groups, reducing the costs of energy while improving public health, but is largely dependent on actual outcomes of such engagement.
Potential Environmental Impacts	Positive - Engaging Duke Energy in goal setting would support the development of broad measures that would generate environmental health benefits and could target resilience, sustainable land use, emissions, and conservation.
Potential Local Impacts	High - Successfully engaging Duke Energy in setting local renewable energy goals would likely increase renewable energy generation within the County / City and improve the position of the County / City as a leader for renewable energy in North Carolina.

Capacity Building Actions

F.1 Provide renewable energy education

Strategy Description: County/City employs a variety of education campaigns to create community buy-in to the various other RE strategies and to encourage voluntary action at an individual or private business level.

Table F.1 Policy Detail; Provide renewable energy education

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low – Implementing an educational program is not a direct way to increase the level of RE in the County/City's energy mix or reduce emissions and is therefore rated as low.
Potential Financial Impact	Low-Medium – The costs of developing and implementing an educational program is expected to be relatively low, but depends on the technologies used, and frequency and method of engagement. Broader and more involved methods of education would cause a greater financial impact.
Potential Feasibility	High – An educational program that has little costs and places little burden on staff is anticipated to have political support and not face any technical or policy barriers.
Potential Equity Impacts	Positive – A RE/EE educational campaign would support the building of an equitable County/City as it would build the awareness of residents and businesses on how to reduce energy related costs.
Potential Environmental Impacts	Positive-Neutral - A RE/EE educational program is not directly related to environmental impacts, but if successful would likely result in increased awareness of environmental benefits of RE and could develop support for increased RE, which has positive environmental impacts.
Potential Local Impacts	Medium-High - This program would have a low impact on RE generation within the County/City, but would occur in the County/City and would elevate the status of the jurisdictions as educational leaders in RE throughout the state.

F.2 Provide renewable energy local workforce training

Strategy Description: County/City creates programs for local workforce training to create local employment opportunities and to ensure that RE industry will be supported by knowledgeable workforce.

Table F.2 Policy Detail; Provide renewable energy local workforce training

Topic	Research and Analysis Highlights
Precedence in Buncombe County and the City of Asheville	N/A
Potential Scale of Impact	Low – Implementing a workforce development program is not a direct way to increase the level of RE in the County/City's energy mix or reduce emissions and is therefore rated as low.
Potential Financial Impact	Low – The cost of developing a workforce development training program is expected to be low and could be supported or entirely funded by federal programs.

Potential Feasibility	High – A workforce development program that has low costs and places little burden on staff is anticipated to have political support and not face any technical or policy barriers.
Potential Equity Impacts	Positive – A RE/EE workforce development program would support the expansion of renewable energy, generating cost savings while providing paid learning opportunities in the RE/EE industry.
Potential Environmental Impacts	Neutral-Positive – although this strategy is not aimed directly at providing environmental benefits, a RE/EE workforce development program would help to grow the RE development industry, which would ultimately create positive environmental impacts.
Potential Local Impacts	Medium - This program would have a relatively low impact on RE generation within the County/City, but would provide local jobs and elevate the status of the jurisdictions as RE workforce development leaders throughout the state.

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Appendix B

Modeling Assumptions

This section outlines the process and assumptions that underpin the quantitative model projections for the baseline and policy scenario impacts.

Development of Baseline Power Projections

The development for Buncombe County's and Asheville's baseline power mix involved three primary analytic steps:

- 1. Forecast of power supply needs through 2042.** Cadmus formed a 2019 generation baseline using utility data available through the City and County municipal utility data, as well as data requests with the Vice President of Western Carolinas Modernization at Duke Energy for the community-wide consumption. Cadmus used data available from Duke Energy Progress' 2018 Integrated Resource Plan (IRP) to forecast an annual increase in supply needs. In the baseline forecast, these forecasts accounted for planned energy efficiency programs.
- 2. Distributed generation resource projections by year.** Current levels of distributed generation resources were obtained from the US Energy Information Administration's (EIA) Form 861 annual utility reporting database. The baseline analysis assumed that new annual distributed generation capacity would be equal to the rate of installations between 2013 and 2017.
- 3. Utility owned generation by year.** Cadmus forecasted the amount of long-term utility-controlled generation sources available through 2042, based on Duke's 2018 Integrated Resource Plan. This forecast accounted for planned plant retirements and resource additions between now and 2042.

Development of Policy Impacts

For each set of policy actions, Cadmus consulted information from prior programs and renewable energy policy literature to project potential impacts.

It should be noted that, for many potential policy approaches, there is significant uncertainty regarding the impacts that would be realized in Buncombe County due to sparse prior data, differences in regulatory and market settings between Buncombe County and the jurisdictions used as benchmarks, and a generally wide range in the potential impacts of different strategies. While the methodology used in this analysis is appropriate to gauge the general scale of impact that different programs and policies may have in Buncombe County, results should be interpreted as having a broad degree of inherent uncertainty.

Pathway A: Actions Already Being Undertaken by the County

The impacts of actions that are currently in process or are being explored by the City of Asheville or Buncombe County were determined through the following approaches:

- 1. Municipalities install and own renewable energy projects.** The potential for solar sited at County- and City-owned buildings was estimated using direct data availability through the City and County. The analysis in this report assumes an available 85,000 square feet of solar-ready and feasible County rooftop space and 400,000 square feet of solar-ready and feasible City rooftop space. Cadmus created a high-level estimate of the potential solar potential at these sites based on assumed available roof space. The average available square footage and space suitable for solar development included a rooftop setback of about 25

percent. The capacity factor for solar panels in this area was calculated using NREL's PV Watts tool, and was estimated at 15.5 percent.

2. **Streamlined permitting, zoning, and inspection for the community.** This policy action describes best practices in local solar policy that have historically been described as targeting the soft costs of solar energy and have been promoted as a set through a series of US Department of Energy SunShot Initiative programs. Cadmus used the results of a Lawrence Berkeley National Laboratory study to estimate the potential price reduction of these solar soft cost programs. Using a Yale study of solar energy price elasticity of demand, Cadmus estimated the increase in solar market penetration that would result from these projected price decreases.
3. **Municipalities lease government land to the utility for renewable energy development.** This policy refers to the lease of vacant public land by Asheville and Buncombe County to DEP for larger-scale renewable energy development. Cadmus assumed that this approach would primarily result in solar projects. Using the Buncombe County GIS land database, Cadmus worked with the County's GIS Coordinator to select parcels identified as potential vacant land. Due to the limitations around interconnection and the rural nature of greater Buncombe County, Cadmus made a conservative estimate of the percentage of sites that could be feasible for solar development. This selection process resulted in around 750,000 combined square feet being available for about 12 MW of land-leased solar development throughout the City and County.

Pathway B: Local Actions Identified as Feasible and High Priority

The impacts of actions that were identified as highly local and highly feasible for the City and County governments to implement were determined through the following approaches:

4. **Municipalities enter into solar leases for projects on municipal buildings.** Similar to Policy 1, this policy assumed the potential for solar sited at County- and City-owned buildings for leasing instead of owning. Potential was estimated using data available from the City and County. The analysis assumes an available 85,000 square feet of solar-ready and feasible County rooftop space and 400,000 square feet of solar-ready and feasible City rooftop space. Cadmus created a high-level estimate of the potential solar potential at these sites based on assumed available roof space. The average available square footage and space suitable for solar development included a rooftop setback of about 25 percent. The capacity factor for solar panels in this area was calculated using NREL's PV Watts tool, and was estimated at 15.51 percent. In order to avoid overlap between leasing and owning panels on the same space, only one policy was evaluated in the model at a time.
5. **Requiring solar to be installed on all new municipal construction and retrofits.** This policy used similar rooftop space assumptions as previous policies, but assumed an average of one new building and one retrofitted building every two years throughout Buncombe County.
6. **Implement a community bulk purchasing program (e.g. Solarize).** The results of an expanded Solarize program were estimated based on the results of the previous Solarize campaign in Asheville. This analysis assumed that 100 new contracts would be signed per campaign, based on previous results from the City of Asheville's efforts, and an average of 5 kW per contract. Finally, the model assumed that campaigns would occur every three years, starting in 2020.
7. **Set up a local renewable energy revolving loan fund.** The local fund assumed an initial capitalization of \$350,000, which was an amount provided by Buncombe County, and an average project tenor of 20 years.

Pathway C: State/Utility Actions

The impacts of actions that were identified as state policy or changes by the utilities serving Buncombe County may impact the progress towards renewable energy goals locally were determined through the following approaches:

- 8. Requiring renewable energy generation on all new construction.** Cadmus worked with the Buncombe County GIS coordinator to get an estimation of annual building growth based on the total number of buildings in the County between 2015 and 2019. An annual growth rate of 2.7 percent was used in calculating the total number of new buildings that are expected, with an average rooftop space of 1,000 square feet. The capacity factor for solar panels in this area was calculated using NREL's PV Watts tool, and was estimated at 15.51 percent.
- 9. Increasing the State Renewable Energy Portfolio Standard.** Cadmus estimated a medium-reach and high-reach RPS policy for the State based on other US States' current RPS standards. This analysis looked at New Jersey's goal for 50 percent renewable energy by 2030 as the medium-reach, and California's goal of 60 percent renewable energy by 2030 as a high-reach. The model calculated the annual increase in renewables that it would take for NC to reach 100 percent by 2030 based on the percent of renewables as a total within the electricity power mix.
- 10. Allow Third Party Ownership (PPAs).** This model used a 2012 study analyzing the effects of third-party ownership on the state of California between 2007 and 2010.¹¹⁸ This model assumed a similar install rate over the first three years of allowing TPO in Buncombe County and normalized the data by population size.
- 11. Implementing a State Green Bank.** Cadmus assumed an initial capital investment into a State Green Bank of \$37,700,000, which was the initial investment into the State's 1996 Clean Water Management Fund Trust. A borrower interest rate of 2 percent was assumed based on research into similar State loan programs,¹¹⁹ with a 2 percent loan loss.¹²⁰ A conservative leverage ratio of 5 to 1 was chosen, based on Virginia Governor's Working Group on Climate Change and resilience noting that Green Banks in other states have leveraged 5-10 private dollars per dollar spent.
- 12. Allowing Community Shared Solar.** Cadmus referred to the State's House Bill 589, which will require Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP) to offer at least 20 MW of community solar in each of their territories. Assuming that this will begin in 2020, the model normalized the total community solar that would be installed in the County based on population, amounting to about 500 new kW of community solar.

Pathway D: Alternative Purchasing Options

The impacts of actions that were identified as actions that are focused on alternative means of purchasing renewable energy than on-site generation were determined through the following approaches:

¹¹⁸ Easan Drury, Mackay Miller, Charles M. Macal, Diane J. Graziano, Donna Heimiller, Jonathan Ozik, Thomas D. Perry IV. The transformation of southern California's residential photovoltaics market through third-party ownership, Energy Policy, Volume 42, 2012, Pages 681-690, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2011.12.047>

¹¹⁹ Michael J. Gergen, George (Chip) D. Cannon, Jr., G. Scott Binnings, *Incentives for Energy Efficiency and Renewable Energy Generation*, Latham & Watkins LLP, <https://www.cesa.org/assets/Uploads/Resources-post-8-16/staterevolvingloanprograms.pdf>

¹²⁰ YCharts, US Loan Loss Reserve / Total Loans for all Banks, retrieved from https://ycharts.com/indicators/us_loan_loss_reserve_total_loans_for_all_banks

13. Increased REC Purchases (municipal and community). Because the municipal entities have minimal limitation on their total REC purchased aside from cost, this model assumed that the City and County municipal operations would scale their REC purchases up to 100 percent of their unmet renewable energy needs over ten years.

For the community, Cadmus first calculated the current REC penetration throughout the State, which is less than 1 percent, and used the leading green power program participation rate of 19.5 percent by participants in Pacific Gas and Electric¹²¹ to scale up from current levels to those of the leading national program over 10 years.

14. PPA Purchasing through Duke (municipal and community). Cadmus assumed that Buncombe County and the City of Asheville could take advantage of the 90 MW that Duke Energy Progress has set aside for their non-residential customers in their Green Source Advantage Program.¹²² This would allow the municipalities to purchase all remaining capacity needs for renewable energy, if given the opportunity. For the community, Cadmus assumed that within the 500 MW of solar available that Duke Energy Progress has set aside for their non-military customers in their Green Source Advantage Program, the greater Buncombe Community would take advantage of about 12.5 MW of that capacity, based on population.

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¹²¹ NREL, Top Ten Utility Green Pricing Programs (2017), <https://www.nrel.gov/analysis/assets/pdfs/utility-green-power-ranking.pdf>.

¹²² Duke Energy, Green Source Advantage, <https://www.nrel.gov/analysis/assets/pdfs/utility-green-power-ranking.pdf>

Appendix C

Summary Memos of Stakeholder Workshops

Stakeholder feedback was a critical component of this analysis. In January 2019, workshops were held to provide stakeholders with information about Buncombe County and the City of Asheville's renewable energy goals and background information on the renewable energy policies that could be used to support such a transition. The workshops were also designed to solicit feedback from stakeholders on their priorities for the renewable energy transition. This Appendix C includes the Summary Memos from each of the January workshops, which include the following:

- Municipal Operations Advisory Group
- Community Advisory Group
- Stakeholder Workshop

Meetings with the Municipal Operations Advisory Group and the broader Stakeholder Group were also held in June 2019. The purpose of these meetings was to provide the preliminary findings from this analysis to stakeholders and obtain feedback on the findings. The format of these meetings was more conversational, as opposed to a facilitated workshop, and the feedback has been incorporated throughout this report.

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Municipal Operations Advisory Group Meeting Summary

Buncombe County and the City of Asheville Renewable Energy Planning

January 30, 2019, from 9am – 12pm

Background:

On Wednesday, January 30, 2019, Buncombe County and the City of Asheville hosted two internal workshops as part of its renewable energy transition planning process. The County and City are working with a consulting team, Cadmus, to identify barriers, opportunities, and pathways to achieving its renewable energy goals of achieving utilization of 100 percent renewable energy in both County and City operations by 2030, and of utilizing 100 percent renewable energy throughout the City and County by 2042.

The purpose of the Municipal Operations Advisory Group meeting was to convene key staff at the beginning of the study to solicit input and feedback on the renewable energy transition plan. Key objectives included:

- Provide County and City operations staff with project context, relevant background information, and potential scenarios for reaching the County and City's municipal goals of 100 percent renewable energy utilization by 2030.
- Determine key interests of underlying staff perspectives
- Identify opportunities of interest for reaching the County and City's municipal goals, and map out these ideas in terms of type of action, impact potential, challenges and partners
- Build support for the transition work among staff.

The notes below summarize key results and takeaways from the project planning meeting.

Attendees:

Representatives from the County and City were invited to attend the workshop, and several of these attendees also completed intake interviews with Cadmus staff the phone ahead of the in-person workshop. Workshop attendees included:¹²³

- Jade Dundas, Capital Projects Director, City of Asheville
- Walter Ear, Program Manager, City of Asheville
- Clint Shepherd, County Energy Manager, Buncombe County
- Kristy Smith, Bioreactor Project Manager, Buncombe County
- Shannon Capezalli, Planner, Buncombe County
- Dane Pedersen, Buncombe County Solid Waste
- Kassi Day, Public Information Officer, Buncombe County
- Bridget Herring, Energy Program Coordinator, City of Asheville
- Amber Weaver, Sustainability Officer, City of Asheville
- Jeremiah LeRoy, Sustainability Officer, Buncombe County
- Jennifer Weiss, Senior Policy Associate, Climate and Energy Program at Nicholas Institute for Environmental Policy Solutions

Key takeaways from their intake interviews include the following:

- Renewable energy goals are being pursued because **community members are interested** in advancing environmental sustainability and social good.
- **Outreach** should be conducted to County and City municipal operations staff for this project.

¹²³ Please note, this list may not be complete.

- **Funding** is a key area of concern for advisory group members.
- **RECs present some flexibility and options** to meet the municipal operations goals.
- The County and City have both **taken steps already** on renewable energy and energy efficiency.
- The water resource plant and reservoir were raised as **potential sites for solar generation**.

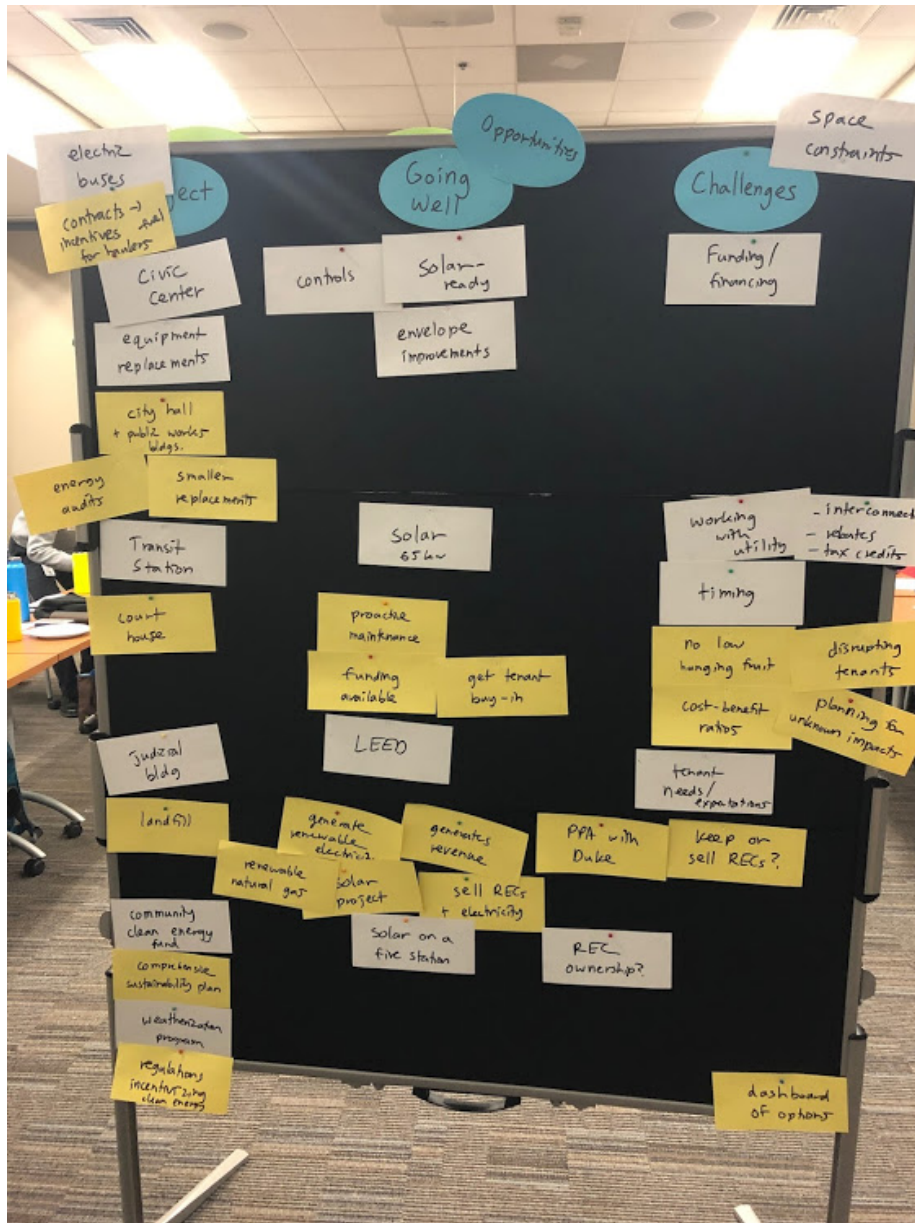
Part I. Workshop Goals and Current Work

Jeremiah LeRoy from Buncombe County and Cadmus staff presented background information on the current energy and policy context of Buncombe County and the City of Asheville and provided an overview of the goals of this work and the planning process. In discussion, the Municipal Operations Advisory Group expressed what they hoped to learn from the workshop. Key questions included:

- **What will implementation look like** for County and City Staff?
- How will the County and City **pay for the transition** while continuing current work?
- How can the County and City **collaborate internally and with the utility?**
- How can the County and City **use the RE transition to deliver core services?**

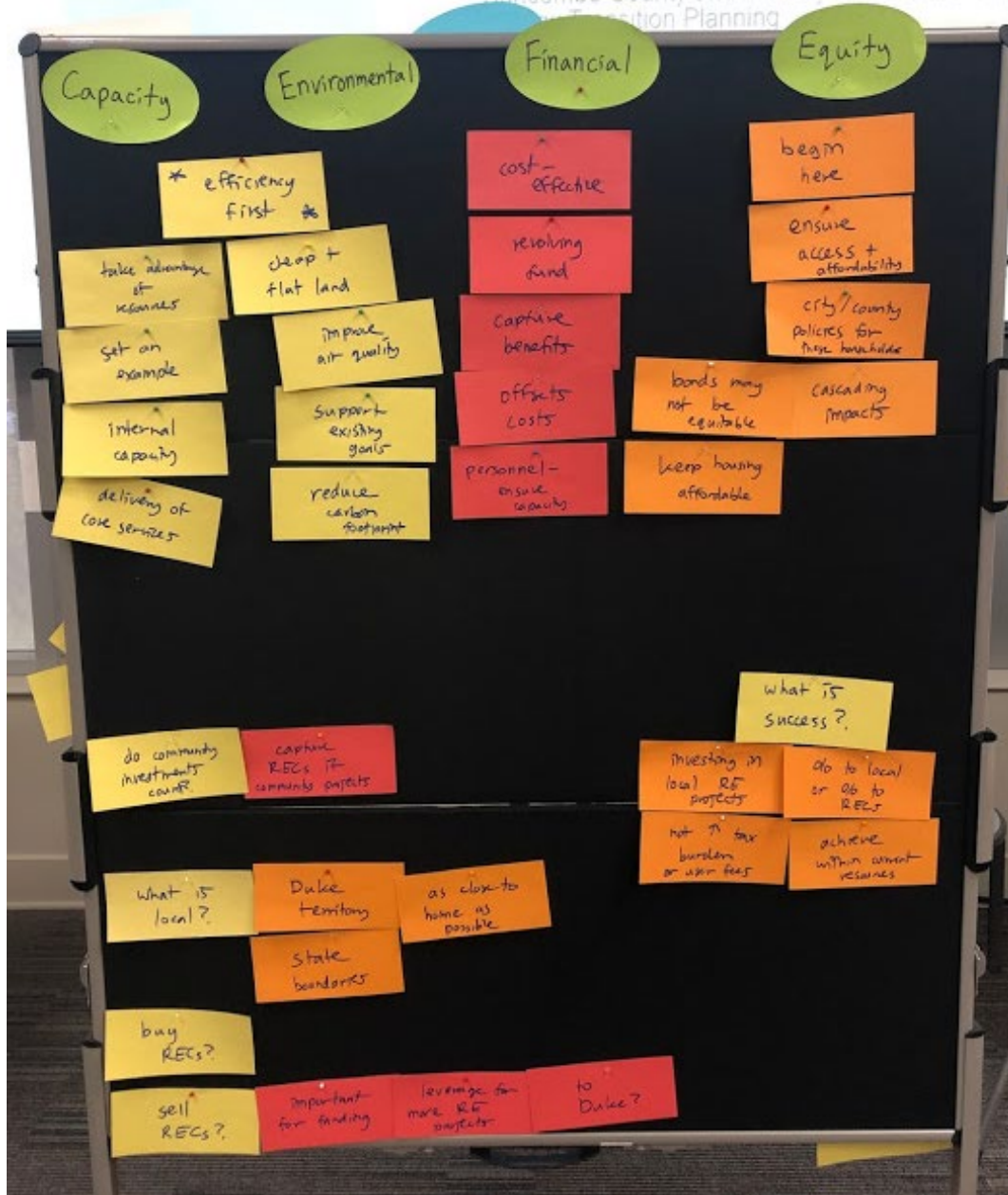
Cadmus then led a discussion of existing renewable energy and energy efficiency efforts in process by the City and County. During this conversation, the Advisory Group discussed:

- Major energy efficiency projects in various city buildings that include **energy audits, small and large equipment replacements, envelope improvements, controls systems, and making buildings solar-ready** (e.g. City Hall, the Civic Center, the Court House and the Public Works Building).
 - Primary challenges of these projects include funding (including accessing rebates and tax credits), disrupting tenants and meeting tenant expectations and needs, space constraints challenging cost-benefit ratios, planning for unknown impacts. Staff also noted that there sometimes is no “low hanging” fruit left with good payback ratios within energy efficiency.
- Renewable energy projects including a **65kW solar array planned for the Transit Station** and the **5 MW solar project on the County landfill**.
 - These projects had similar challenges to those noted for energy efficiency projects (see above), as well as working with the utility (including the interconnection request process). Discussion around the landfill project including an uncertain future PPA with Duke. For the landfill projects, the working group members noted the opportunity to generate revenue, renewable energy, and to potentially sell RECs for future revenue.
- Other work discussed included the City’s Comprehensive Plan and use of regulations and incentives for clean energy, the current weatherization, the Community Clean Energy Fund, efforts to transition to an electric bus fleet, and efforts to change the incentives in waste hauler contracts.
- Additionally, advisory group members focused on the topic of renewable energy credits (RECs) – how they work, how many RECs would be required to meet the municipal renewable energy goal and the associated costs; and whether RECs should be used to generate revenue.
 - While no consensus on this topic was reached, **there was an interest in exploring options to sell RECs to Duke to generate revenue streams** for addition energy projects in the County and City.



Part II. Priorities for the Renewable Energy Transition

Following a framing presentation that outlined the types of impacts to consider in reaching the County and City’s renewable energy goals, the Municipal Operations Advisory Group next participated in a brainstorming exercise to better define the types of priorities underlying the renewable energy goal. Priorities were sorted into four categories: 1) renewable generation capacity, 2) environmental, 3) social equity, and 4) financial. This input will help inform the policies and strategies prioritized for further analysis by Cadmus and considered as potential solutions to pursue. The photo below summarizes the criteria raised via discussion.



Key priorities identified included:

Generation Capacity:

- **Address energy efficiency first** to help reduce overall energy needs
- **Take advantage of local resources** for energy generation (e.g. cheap and flat land)
- The County and City should **set an example** by building and/or supporting renewable generation
- Renewable energy generation should **help the city better deliver its core services**

Environmental:

- Renewable energy should **improve air quality**
- These efforts should **support the City and County's existing sustainability goals** and other goals
- A priority should be **reducing the City and County's carbon footprint**

Financial:

- Priority should be given to **projects that are cost effective**
- There is interest in **capturing cost savings and creating a revolving fund** for renewable energy and energy efficiency investments
- Project benefits should **offset their costs**
- A priority should be **ensuring there is staff capacity** for this work

Social Equity:

- This is an important **place to focus and begin** for the renewable energy transition
- Social equity includes **ensuring access** for low-income communities, communities of color to renewable energy and **ensuring this energy is affordable**
- **Housing should also be kept affordable** / costs should not rise because of this transition
- City and County policy should be designed to benefit low-income households and communities of color
- **Bonds may not be an equitable way to raise funding** for the renewable energy transition
- Need to be aware of **cascading impacts renewable energy strategies** on low-income households and households of color

Additionally, participants discussed several key framing questions for the renewable energy transition plan:

- **What is success?**
 - Investing in local renewable energy projects (Just buying RECs is *not* success)
 - Local renewable energy projects do **not** increase tax burdens, nor do they create new user fees
 - Goal should be achieved using current resources (as much as possible)
 - Possibly selling RECs to obtain resources to do more local RE projects, even though it means you don't get to claim the REC sold
- **What is local renewable energy generation?**
 - As close to home as possible
 - NC State boundaries
 - Duke Territory
- **Should RECs be bought or sold? And if sold, then to whom?**
 - RECs are important of funding, and can be used to leverage for more RE projects
 - Is it ok if the RECS are sold to Duke?
- **Do City or County investments in renewable energy in the community count towards the City and County's goal?**
 - City and County should keep RECs for community projects to count them

Part III: Renewable Energy Policies and Programs

Cadmus staff next presented on potential strategies for local governments to use to transition their energy supply (primarily electricity) to renewables. Categories of action include: (1) direct action -- where County or City resources and powers are used to support local renewable projects; (2) collaboration at the state and utility level to drive market growth; (3) accessing and utilizing renewable energy purchasing options; and (4) gaining direct control over power supply. Following the overview, staff discussed additional solutions to consider, and which of the proposed solutions were of most interest. The results are summarized below:

- **Program for deferred maintenance and energy efficiency;** require an allocation for energy efficiency and/or renewable energy as part of this
 - Could consider a targeted tax option with the City and/or County's powers, akin to the 1 percent tax for public art in Asheville
 - Funds would be needed in addition the current budget

- **Aggregate onsite projects** in a Solarize-style model
 - This could be a City-County partnership
 - Can assess and look at options
- **Maximize County and City lease space** for renewable energy projects
- Consider a contract for **virtual PPAs**
 - Question was raised if this is possible/viable as a pathway

Cross-cutting challenges raised as part of this discussion included:

- Balancing and learning about community expectations and understanding of this work
- Cost (avoiding zero-sum options/positions)
- Perception or reality that bonds and taxes can't be increased
- Unintended consequences analysis is needed for programs and policies, especially related to social equity
- What timeframe makes sense for implementation



Part IV: Closing

To close the meeting, participants discussed questions that were outstanding that they hoped would be answered through the course of the planning process:

- How many RECs are required to meet the renewable energy goals and what is their cost range?
- Does it make sense for the City and County to utilize virtual PPAs?
- What does a “good deal” look like for a renewable energy project?
- How can the renewable energy transition plan best utilize the County and City land/property and project aggregation?

- How can the City and County offset costs of the renewable energy transition and reinvest into the County/City to improve core services?
- How can we ensure that equity is a key part of the plan and that we ensure there are not unintended consequences for people of color and low-income households?
- What peer cities can Buncombe County and Asheville learn from?
- How does Buncombe County and Asheville define local generation?
- What is the definition of success to use in reaching the renewable energy goals?

Community Advisory Group Meeting Summary

Buncombe County and the City of Asheville Renewable Energy Planning

January 30, 2019, from 2pm – 5pm

Background:

On Wednesday, January 30, 2019, Buncombe County and the City of Asheville hosted two internal workshops as part of its renewable energy transition planning process. The County and City are working with a consulting team, Cadmus, to identify barriers, opportunities, and pathways to achieving its renewable energy goals of achieving utilization of 100 percent renewable energy in both County and City operations by 2030, and of utilizing 100 percent renewable energy throughout the City and County by 2042.

The purpose of the Community Advisory Group meeting was to convene members of community organizations at the beginning of the planning process to collect perspectives on potential strategies to meet the community-wide goal. Specific objectives of the meeting included:

- Provide County and City community members with project context, relevant background information, and potential scenarios for reaching the County’s community-wide goal to utilize 100 percent renewable energy by 2042;
- Determine key interests of underlying community perspectives;
- Identify opportunities of interest for reaching the community-wide goal, and map out these ideas in terms of type of action, impact potential, challenges and partners; and to
- Build support for the transition work among the community.

The notes below summarize key results and takeaways from the community advisory group meeting.

Attendees:

Four representatives from the County and City attended the workshop as community advisors, and completed intake interviews with Cadmus staff the phone ahead of the in-person workshop.

- Alesha Reardon, Energy Manager, Buncombe County Schools
- Michelle Myers, Center for Biological Diversity; represents the Western Renewable Coalition – a collection of more than 30 nonprofits in the region
- Pat Deck, Former Educator, Neighborhood Advisory Committee Member
- John Noor, local Environmental Attorney, Sustainability Advisory Committee on Energy and the Environment member

Key takeaways from their intake interviews include the following:

- Renewable energy goals are being pursued because community members are interested in **advancing environmental sustainability and social good.**
- **Education and outreach** need to be conducted throughout the whole community, as well as for municipal operations at both the County and City levels for this initiative.
- The **community needs to buy into this initiative**, needs to understand why it is important, and how it impacts their own lives in a beneficial way.
- The renewable energy plan should account for the County and City's existing assets and should be **reasonable in terms of cost.**

Part I. Workshop Goals and Current Work

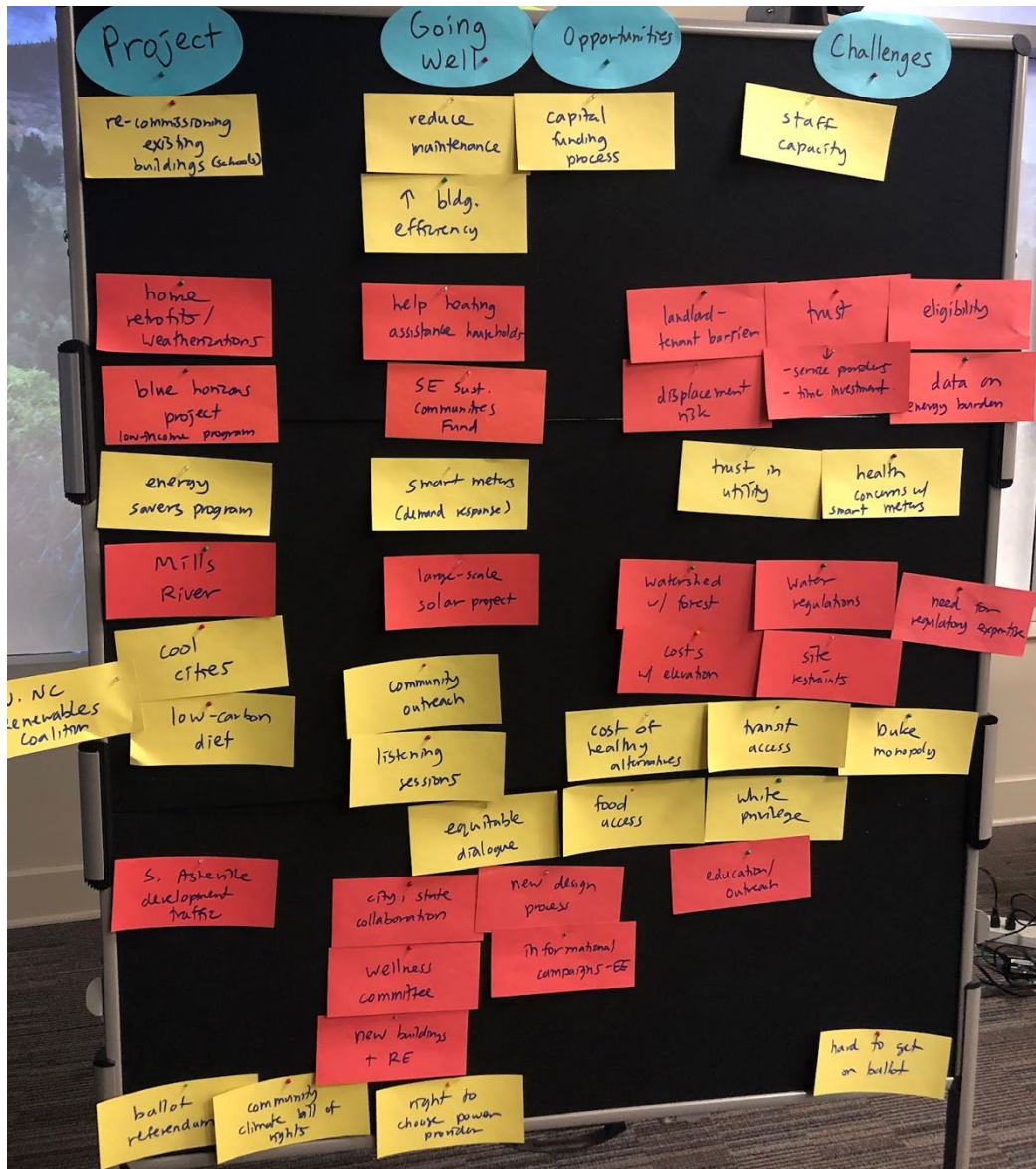
Cadmus staff presented background information on the current energy and policy context of Buncombe County and the City of Asheville and gave an overview of the goals of this work and the planning process. In discussion, the Community Advisory Group expressed what they hoped to learn from the workshop. Questions centered around the following:

- How to achieve the goals in an **equitable** way?
- What is the most **efficient way** to achieve the goal?
 - What is considered **low-hanging fruit**?
- How to bring renewables into the **school system**?
- How to **engage young citizens** in this transition?
- What will the renewable energy plan look like – **what it will and will not include?**
- What will the **process be over the next six months?**

Cadmus then led a discussion of existing renewable energy and energy efficiency efforts that the community members have been involved with or are aware of, as well as current barriers or challenges to renewable energy within the community. During this conversation, the Advisory Group discussed:

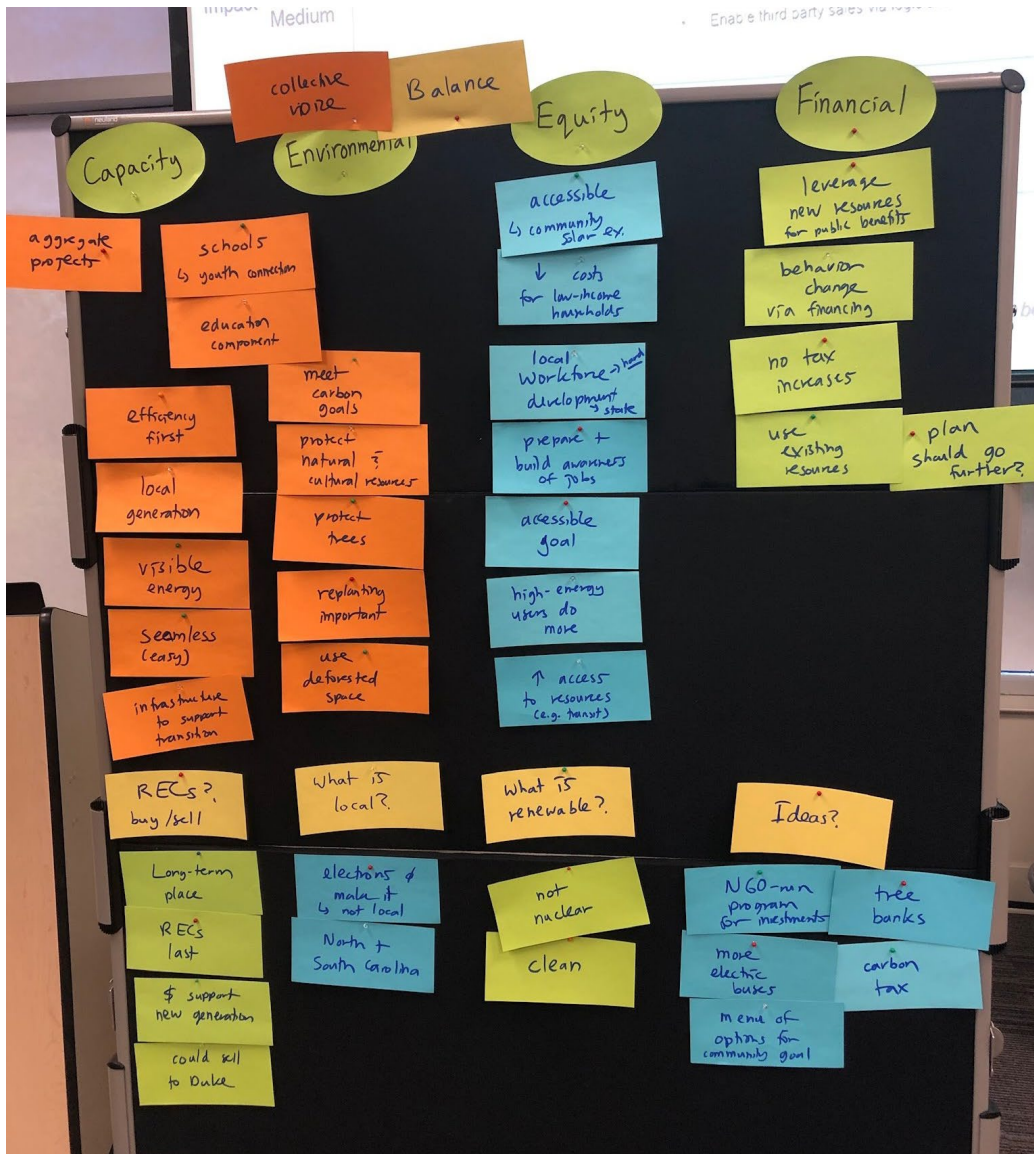
- Current efforts to **re-commission school buildings** to improve efficiency
 - Opportunities include reducing recurring maintenance costs, using the capital funding process to pursue the work, and increasing the efficiency.
 - Staff capacity was noted as a challenge.
- Work done by the **Blue Horizons Project** to provide assistance for low-income communities to provide heating retrofits in Buncombe County
 - Opportunities include helping households on home heating assistance programs and using the SE Sustainable Communities Fund.
 - Challenges include limited eligibility, landlord-tenant barriers, trust within low-income and communities of color, displacement risk, and data access
- **The Energy Savers Program**
 - Opportunity to get smart meters in households for demand response. Trust in the utility having more access to household energy use and health concerns with smart meters were noted as concerns.
- Duke's **proposed solar project at the Mills River site**
 - Challenges include site constraints, cost, and environmental and regulatory challenges,
- Efforts by members of the Western NC Renewables Coalition to conduct **community listening sessions** about sustainability topics, including renewable energy
 - Opportunities within this work have been community outreach, listening sessions, and an equitable dialogue centering community member who have traditionally had less voice in processes.
- Efforts in a continuous care retirement community to start a **recycling program and an informational campaign around energy efficiency and conservation.**

- Opportunities from this work included lessons learned around informational campaigns and using a wellness committee structure within the community to organize action



Part II. Priorities for the Renewable Energy Transition

Following a framing presentation that outlined the types of impacts to consider in reaching the County and City’s renewable energy goals, the Community Advisory Group next participated in a brainstorming exercise to better define the types of priorities underlying the renewable energy goal. Priorities were sorted into four categories: 1) renewable generation capacity, 2) environmental, 3) social equity, and 4) financial. This input will help inform the policies and strategies prioritized for further analysis by Cadmus and considered as potential solutions to pursue. The photo below summarizes the criteria raised via discussion.



Themes discussed included:

Overarching priorities:

- There is a healthy **balance** to find across the different priorities expressed.
- Education and outreach to the community are important to develop a **collective voice** around the priorities and structure for meeting the County and City's renewable energy goals.

Generation Capacity:

- An important priority is to **address energy efficiency** to help reduce overall energy needs.
- **Local generation** is important, as well as **visible generation** that people can see.
- Systems should be set-up to make the **transition to renewables easy and seamless**.
- **Projects should be aggregated** wherever possible for greater cost efficiency.
- Working with Duke Energy use **Buncombe County Schools for solar leasing** that features an **education component**, and to define community solar and how to have it benefit low income and communities of color.

Environmental:

- **Environmental preservation** is also a priority to remember in renewable energy development – **don't deforest land** to install solar development or other renewables (e.g. avoid greenfield development) and replant where needed.
- **Meeting carbon reduction goals** is an important priority.

Social Equity:

- Participants also prioritized **equity**, and making sure **programs are inclusive and accessible** to the entire community, and that they improve services provided to low- to moderate-income residents and communities of color.
 - Part of this is also **ensuring that costs are lower for low-income households**, so the transition improves affordability.
- **Education and community buy-in** was also a priority, with discussions on the importance of making the renewable energy transition significant issue that the whole community can support
- The transition should tap opportunities to prepare **young people** for future careers in the renewable energy industry and include a **workforce development and jobs component**. It was also noted that this is hard to do and challenging in NC's policy context.
- **High-energy users should be asked to do more** as part of the transition than low energy users.
- The transition should consider **intersections that increase access to other resources**. For example, how can this work connect to improved transportation access was one question raised.

Financial:

- New resources from the transition should be leveraged for public benefits.
- It is important to **keep costs down, not raise taxes, and use existing resources** to implement the plan.
 - There was some difference of opinion on this point with County and City staff expressing this priority more strongly than the community advisors.
 - One advisor noted that the **plan should also consider options that will cost money and require more resources**.
- Financing programs can be structured to encourage behavior change.
- **Buying renewable energy credits (RECs) is a low priority and a later/last step in the process**
 - The Cadmus team should **explore options that involve selling RECs from local projects to Duke** to support new generation capacity

Additionally, participants were asked several questions during the discussion related to program evaluation and the details of capacity generation. The questions and answers are listed below.

- What is local generation?
 - Electrons that are generated in one location can make it to the buildings they are serving
 - North and South Carolina-based generation
- What is renewable energy?
 - Not nuclear power
 - Clean power

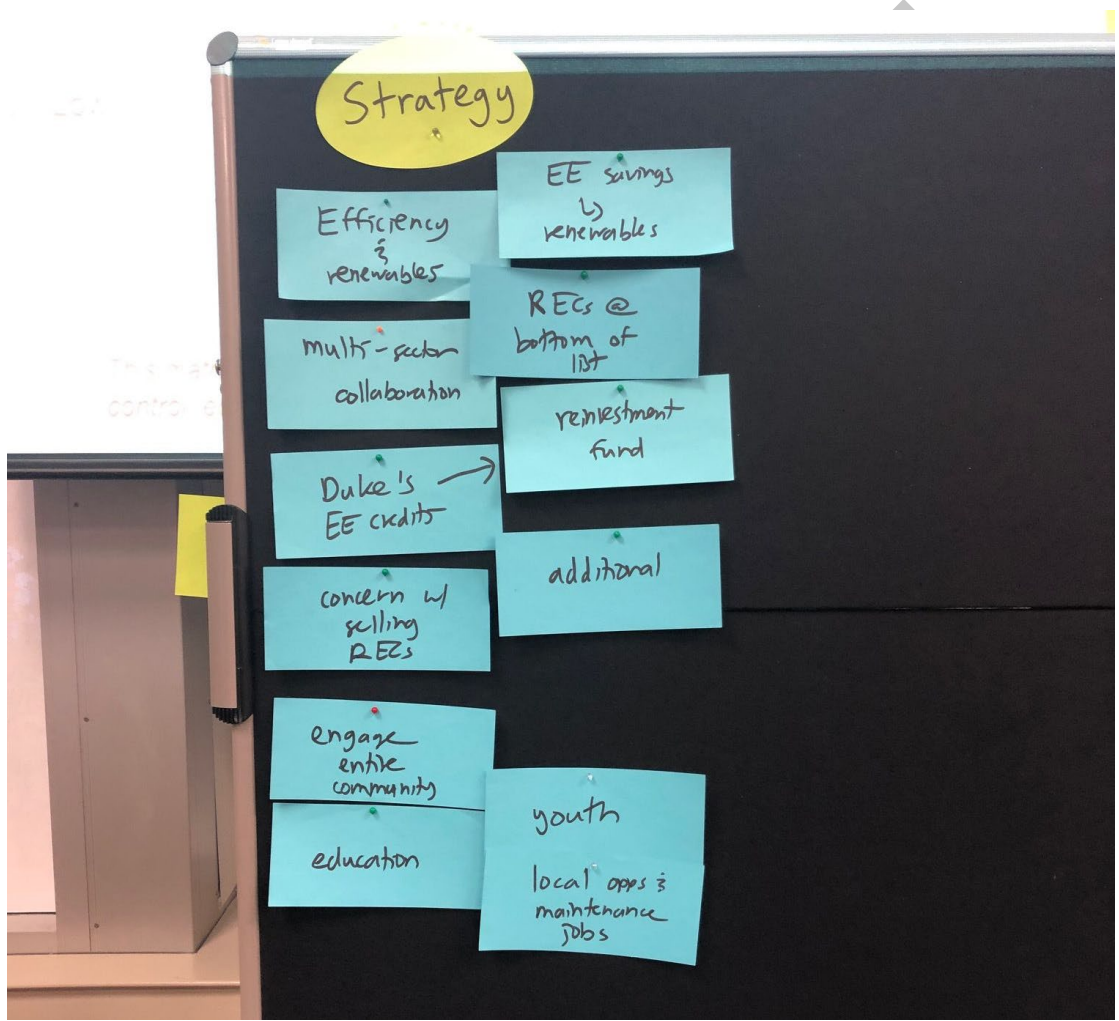
Several program-based ideas were suggested during the discussion for the project team to consider in their analysis (and/or for other County and City sustainability work):

- NGO-run program to manage voluntary investments citizens want to make in the renewable energy transition
- Menu of options for meeting community goals

- Tree bank – if a tree is cut down as part of a renewable energy project, then it must be replaced (or a fee paid to a Tree Bank that will replace it)
- Carbon tax
- More electric buses

Part III: Renewable Energy Policies and Programs

Cadmus staff next presented on potential strategies for local governments to use to transition their energy supply (primarily electricity) to renewables. Categories of action include: (1) direct action, where county or city resources and powers are used to support local renewable projects; (2) collaborating at the state and utility level to drive market growth; (3) accessing and utilizing renewable energy purchasing options; and (4) gaining direct control over power supply.



Stakeholder Meeting Summary

Buncombe County and the City of Asheville Renewable Energy Planning

January 31, 2019, from 9am – 1pm

Background:

On Thursday, January 31, 2019, Buncombe County and the City of Asheville hosted a stakeholder workshop as part of its renewable energy transition planning process. The County and City are working with a consulting team, Cadmus, to identify barriers, opportunities and pathways to achieving its renewable energy goals of achieving utilization of 100 percent renewable energy in both County and City operations by 2030, and of utilizing 100 percent renewable energy throughout the County by 2042. The purpose of the stakeholder meeting was to convene members of community organizations at the beginning of the planning process to collect perspectives on priorities and potential strategies to meet the community-wide goal. Specific meeting objectives included:

- Provide County and City community members with project context, relevant background information, and potential scenarios for reaching the County's community-wide goal to utilize 100 percent renewable energy by 2042;
- Determine key interests underlying different stakeholder perspectives;
- Identify opportunities of interest for reaching the County and City's municipal goals and the community-wide goal, and map out these ideas in terms of type of action, impact potential, challenges, and partners;
- Build support for this transition work from different stakeholders.

The notes below summarize key results and takeaways from the project planning meeting.

Attendees:

- Beth Gentry, A-B Tech
- John Coon, Asheville Airport
- Brad Rouse, Energy Savers Network
- Ron Edgerton, Sierra Club
- Rich Olejniede, Mountain Housing Opportunities
- Paul Reeves, Habitat for Humanity
- Sophie Mullinax, Blue Horizons Project
- Aisha Shepherd, Buncombe County
- Brenda Mills, City of Asheville
- Rasheeda McDaniel, Buncombe County
- Jade Dundas, City of Asheville, Municipal Advisory Group Member
- Dirk Wilmoth, A-B Tech
- Heath Moody, A-B Tech
- Kristy Smith, Buncombe County, Municipal Advisory Group Member
- Chris Dobbins, LOSRC
- Adam Colette, Dogwood Alliance
- Walter Ear, City of Asheville, Municipal Advisory Group Member

- Alesha Reardon, Buncombe County Schools, Community Advisory Group Member
- Jane Hatley, Self-Help Credit Union
- Rebecca Brothers, Buncombe County
- Michelle Myers, Center for Biological Diversity, WNC Renewables Coalition, Community Advisory Group Member
- Bill Ealk, Land of Sky, Clean Vehicles Coalition
- Lucia Daugherty, SPARC Foundation
- Barbara Darby, Mountain Area Workforce, Land of Sky
- Bridget Herring, Energy Program Coordinator City of Asheville
- Amber Weaver, Sustainability Officer, City of Asheville
- Jeremiah LeRoy, Sustainability Officer, Buncombe County¹²⁴

Part I. Renewable Energy Policy and Program Pathways

Following stakeholder introductions, Cadmus staff presented an overview of the project, North Carolina's renewable energy policy context, and preliminary policy and program options from Pathways to 100 as a starting point and strategies that could work for the City and County. Throughout the presentation, there was time for Q&A. Key questions are noted below:

- **Goal definition:** Stakeholders asked questions regarding the parameters of the renewable energy goals. Specifically:
 - If the focus is mainly on electricity
 - The sequencing of electricity generation/supply; energy efficiency, building electrification; and transportation actions
 - Clarification on the decision-making process of the renewable energy plan, including how the County and City should prioritize pathways to achieve their goals, such as using virtual power purchase agreements (PPAs) and buying or selling renewable energy credits (RECs)
- **Social Equity:**
 - One attendee noted that there has been success in the past through the Blue Horizons Project in engaging low- to moderate-income and diverse voices in the process
- **Financial:**
 - During the course of discussion, one stakeholder asked if there are budgeting parameters that should be considered to bound the framing of what might be possible in terms of strategies
- **Strategies:**
 - **Renewable Energy Credits and Virtual Power Purchase Agreements.** Stakeholders asked for clarification on the differences between strategies and the impacts of using either RECs or virtual PPAs to achieve the renewable energy goals.
 - **Utility Collaboration.** One attendee noted that Buncombe County and the City of Asheville have a strong track record of utility engagement with Duke Energy through the EITF and Blue Horizons initiative. Another stakeholder asked whether on-bill financing through Duke could be possible.
 - **State/Federal Engagement.** A couple of participants noted that there may be programs at the federal level that may help Buncombe County achieve its goal. Specifically mentioned was the potential of a carbon tax, or resilience requirements.

¹²⁴ Please note, this attendee list may be incomplete. To be completed with input from City/County staff.

- **Homeowner Association Education and Outreach.** One stakeholder noted in response to group purchasing, that some HOAs outright ban renewable energy systems or have restrictive covenants. This was discussed as an opportunity for the County or City to engage with these associations on this topic.
- **Additional strategies:** One stakeholder noted that the EITF had considered acquiring rights to hydropower wheeled through the Tennessee Valley Authority.

Part II. Collective Visioning

Following the Policy and Programs Pathways presentations, stakeholders participated in a Collective Visioning exercise, in which they wrote a postcard to themselves from the year 2042 – describing what the renewable energy transition looks like. After writing their postcards, Cadmus facilitators read the postcards aloud to the entire workshop group before breaking the stakeholders into smaller working groups.

Key themes from the postcards are organized below:

Expected outcomes:

- The County and City’s renewable energy goals have been successfully met through **partnerships, collaboration, and education**
- Renewable energy is present *within the community*:
 - Community is “**fully solarized;**” specifically there is solar on all public buildings and schools and the majority of buildings within the County
 - **5 MW of solar power** will be developed **on the Buncombe County landfill.**
 - Additional renewable energy opportunities mentioned include **renewable natural gas, geothermal, hydropower, landfill gas reclamation, animal/human waste to energy, and wind** (small and large-scale), indicating a large diversity of power sources
 - Coal energy is gone
- Energy efficiency is a key step:
 - Community members will know more about how to manage and their energy use and **consumption is reduced** via efficient technologies and conservation
 - Home technologies in use include **heat pumps and energy efficiency upgrades**
- Transportation is cleaner:
 - Everyone uses **bicycles**
 - Car manufacturers **only make electric vehicles**
 - The city has a robust **EV charging network**
- Equity is a core focus of the programs and initiatives:
 - **Savings are passed through** to residents
 - **Housing is affordable,** and housing is energy efficient
 - Efforts **help families** and those in need
 - Low-income households have **low- or no-cost options to participate** in the transition
 - **Savings are channeled into the community**
 - The transition happens in a way that **breaks down systems of oppression** and injustice
 - Renewable energy is **free or low-cost**
 - The **air is clean**
- State policy changes to allow for more widespread renewable energy adoption:

- **Power purchase agreements are allowed**
- Utility market **deregulates**
- A **millionaire's tax** helps fund the transition/solar on buildings
- Electric utility reacts to a changing market:
 - Duke has a **power plant at Lake Julian**
 - Duke offers **on-bill financing**
 - **3rd-party sales** are allowed
 - Duke become a **cooperative utility**

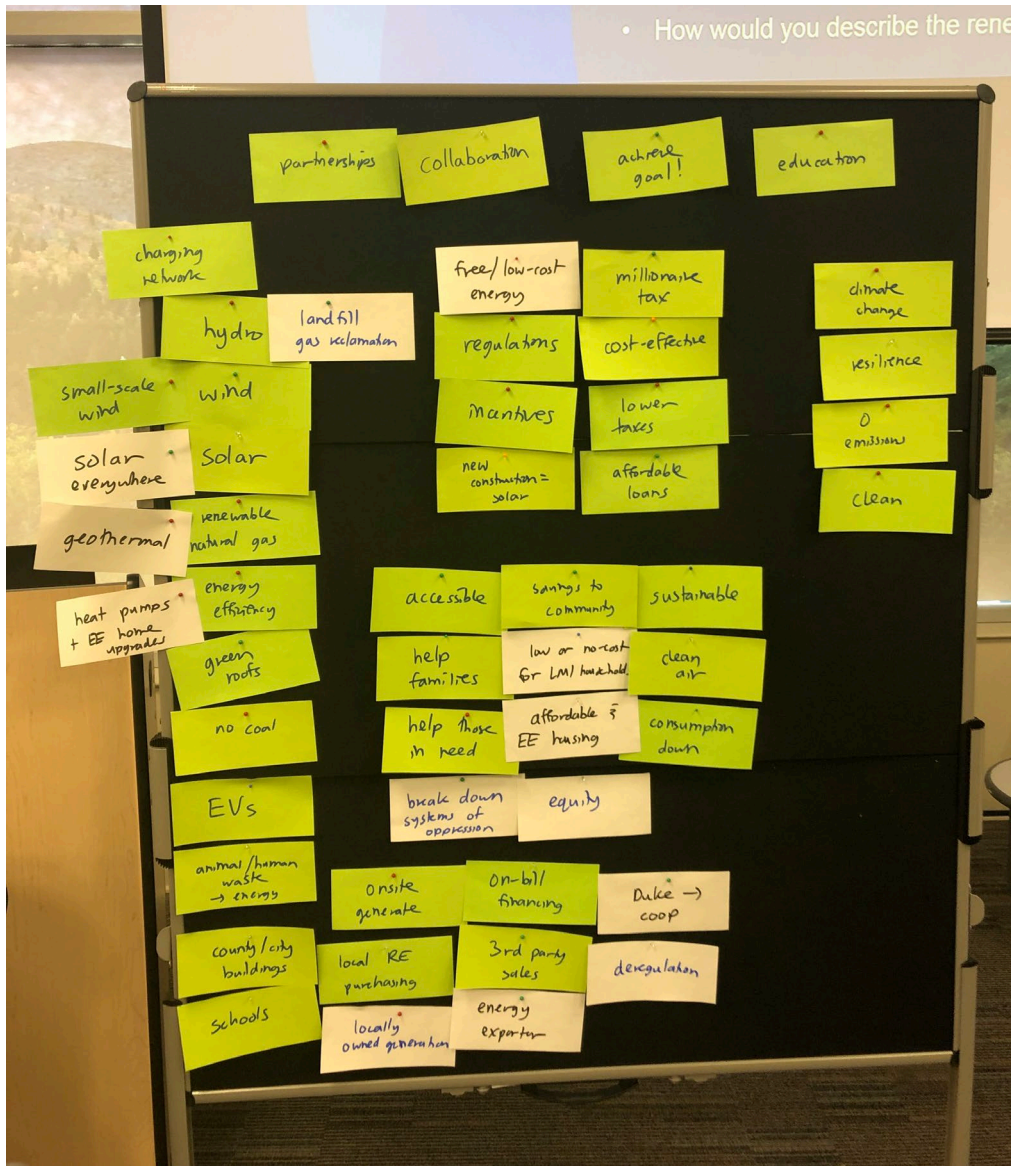
Means of Success:

- Local Policy and Programs:
 - **Mandates are passed for solar** on new construction
 - **Virtual power purchase agreements** (limited by geographic scope)
 - **Loan guarantee fund for low-income residents** for solar energy or energy efficiency
 - **Taxes can ultimately be lower** as the transition lowers costs and boosts the economy
 - **Smart regulations** help guide the transition
 - **Cost-effective** investments are prioritized
 - Buncombe County generates enough **renewable energy for export** or to be sold through virtual means.
- Initiatives:
 - There has been an investment in **both local renewable energy generation, as well as investment in renewable energy credits** (particularly local credits)
 - There are **public private partnerships**
 - The County and City have **invested in energy efficiency**
 - There has been a **strong focus on education and outreach**, that is collaborative and inclusive. Public outreach focused on **identifying benefits of the transition**. Similarly, **education and outreach has been focused on new residents, new businesses, people of color, and young people**.

Other noted changes by 2042:

- Throughout the course of discussion, stakeholders noted a number of **changes that may be brought about by the changing climate**, including a loss of trees, changes to population, and utilities reacting to climate change
- They also reiterated themes of **tackling climate change, building resilience, moving to 0 emissions, and achieving clean energy** as overarching goals

After the reading of all the postcards, **members of the large group expressed initial reactions to the postcards**. Several members expressed that the concept of time stood out in the postcard exercise – that **23 years is both a very long time and a very short time in which to enact significant changes**. Many conditions can change within that time, including the local population size and education about renewable energy, the grid load, and technology. Several members noted that due to these future variables, the plan should be adaptable.



Part III. Small Group Discussions: Program and Policy Priorities

Following the report-out and discussion on the Collective Visioning exercise, the stakeholders were divided into four pre-designated breakout groups. In these groups, the stakeholders were asked to (1) react and respond to the visions from the Postcards to the Future and discuss priorities for the transition (2) identify preliminary programs and policies that resonate with them, and (3) to identify potential challenges and opportunities related to these programs and policies.

Key themes on priorities from the small-group discussions are described below. Results have been aggregated across the four break-out groups.

- **Outreach, education and community buy-in.** Stakeholders expressed a strong preference to prioritize outreach, education, and building community buy-in as part of a successful in the RE transition. Specific thoughts or ideas for action include:

- Opinions expressed at this meeting may not reflect broader community opinions and perspectives, so need more outreach, particularly to vulnerable communities who live day-to-day. Need to show them the benefits of this transition (e.g. improving services, providing alternatives, more affordable housing, etc.).
- Be inclusive with outreach and invite *everyone* to the table at the beginning of the process, especially people of color and low- and moderate-income communities. Community outreach is extremely important.
- Messaging must be simple and comprehensive (in plain language), accessible, and motivational. It must make people understand the benefits to all individuals of the renewable energy transition and inspire self-interested people to working in furtherance of the goal is worthwhile.
- Education on RE and the transition should happen in the schools
- Internal staff education at the County and City is also needed – should consult with City and County staff before setting goals
- Benefits to capture from this transition include improved public health, job opportunities, increased community resilience, optimism for youth and faith in the future, and strong County and City reputation, which can connect to tourism and economic development
- Focus on communication and relationships ahead of technology solutions
- Understand what language and messaging resonates and clear and simple language that is easy to understand
- Progress needs to be concrete (see notes about “local generation” below for more)
- Strategic use of social media for communication
- **Social Equity:** Stakeholders expressed a strong preference for social equity to be a central part of the County and City’s renewable energy transition:
 - Equity and inclusion are necessary for success – without it the entire community won’t be involved, and therefore the community-wide goal won’t be successful
 - From past experiences, know that if social justice is not a component then the issue becomes divisive and does not move forward
 - Part of equity is hearing all voices
 - Should consider how the 100 percent renewable energy transition impacts our most vulnerable community members
 - Create more tools to add value in an equitable way (i.e. solar for affordable housing)
 - Provide space for people of color and low- and moderate-income communities. Improve community services
 - Improve energy efficiency in affordable housing
 - Build community wealth via the transition
- **Energy Efficiency:** Stakeholders expressed strong interest in including energy efficiency measures as part of the renewable energy transition:
 - Energy efficiency should come first as a way to reduce overall energy demand and the amount of renewable energy that must be produced or purchased.
 - Energy efficiency measures should be used to remove barriers and improve participation in achieving the goal for low-income communities and for everyone
 - Create a revolving fund for energy efficiency investments

- Focus on removing barriers here
- **Local Renewable Energy Generation:** Stakeholders expressed support for prioritizing solutions that are “local,” although definitions of “local” varied among stakeholders:
 - Renewable energy should be produced locally, and local energy production encourages community buy-in and emotional investment in the project
 - Invest in projects with good paybacks
 - Such projects can include highly visible projects like retrofitting schools and government buildings for energy efficiency, or installing solar panels on such buildings
 - The County/City’s image improves more when you can see the renewable energy projects
 - Being a “climate city” attracts other businesses, can improve tourism
 - The County and City should install solar projects on County and City property
 - Capital project and renovations should include energy efficiency and solar by default
 - Commit to this and put funding there
 - Could consider a future bond for city buildings and include renewable energy in it
 - Include AB Tech buildings in this
 - Get real engineering estimates and who what five years can look like and think longer-term with investments about what is best for the community
 - Discussions on the definition of local generation included:
 - Local does not include wind or solar farms from places like Oklahoma but can include projects that contribute to the grid that serves Buncombe County.
 - Renewable energy projects should be located as local to the County and City as possible
 - 100 miles away may still be local
 - Regional may still be local (e.g. adjacent counties)
 - North Carolina
 - General principle could be to start as local as possible
- **Affordable and Realistic Goals:** Stakeholders expressed support for solutions that are affordable and realistic for the County and City to implement, and that are affordable and realistic for citizens.
 - Policies must fit within competing priorities of the government and not detract from existing programs.
 - In terms of affordability, the community should consider the micro-level impact to each household (and equitable impacts)
 - In implementing the renewable energy transition, it is important to consult with County and City staff before setting goals to determine realistic budget, funding, and to get real engineering estimates of what will be needed
 - Staff should participate in discussion and educational opportunities about the goals to build buy-in
 - 5-year check-ins to reassess priorities, progress, and budget are important
 - Reality will be completely different in 2042, so need to revisit and revise along the way
 - Some concern was expressed that ideas in the visions were not realistic and incremental steps are important to take; also, a very uncertain timeframe
- **Financial:** In line with issues of affordability, stakeholders also discussed the importance of establishing the right financial programs for the transition:

- Important to build wealth for the County and City
- Important to invest in strong capital infrastructure so that all the other pieces fall into place.
- Possible sources of money for the renewable energy transition could include tourism tax revenues
- Budget diversification will help with the transition (have a big infrastructure deficit right now too to contend with)
 - Property tax (requires state policy change)
 - Sales tax (must be carefully structured to not be regressive)
 - Tap into tourism tax (requires state policy change) – how to do this at the state level?
 - Community land trusts
 - More dedicated funding to address challenges
- The County/City could delegate some responsibility to the business community – i.e. “adopt RE”
 - Create competition programs within the community – good press for participants and doesn’t cost the County very much.
- Can or should the County / City implement a carbon tax?
- There is potential to receive additional funding from the upcoming hospital acquisition
- Importance of ROI and accountability from renewable energy projects
- Concern that policies and investments need to reflect Asheville’s commitment to reaching its goals and achieve goals despite costs. If costs are prohibitive enough to stall action, why did the County and City set goals at all?
- Goals need to better connect with investment
- State connections:
 - Should connect with the State Housing Finance Agency and tap state financing and credit opportunities
- Learn from what other governments have done that is cost-effective in the short- and long-term
- **Strategies for Direct Action:** Stakeholder expressed a preference to engage in actions at the local level where the County and City would have direct control:
 - Energy Purchasing: Questions were raised about REC and Virtual PPA strategies, and the benefits of either claiming RECs to impact your power mix or selling RECs to improve revenue and ability to fund other renewable energy projects. Discussion on this topic included the following opinions:
 - Want to purchase from a place that would not have created the renewable project “but for” the County and/or City’s purchase. Additionality is important (adding additional generation to the grid based on the County/City’s purchase)
 - Importance of owning versus selling REC:
 - Owning provides the claim to renewable energy generation, but selling would provide financial security and funding for the transition
 - Interest in multiple groups on selling RECs in the short-run for revenue generation (though noting tradeoffs with that option)
 - Reinvest revenues into renewable energy/sustainability programs, such as for schools, gov’t buildings, and better transportation systems

- Virtual PPA discussion and questions related to the area/region for the purchase, with a preference expressed towards virtual PPAS on the same grid as the County and City. There is also the potential to work with corporations like Apple or Amazon and questions about if this a credible approach.
 - Permitting and zoning strategies: “Solar-ready,” “climate-smart,” “EV-ready”
 - Local generation (see notes in “local” section above)
 - **Strategies for Collaboration:** Stakeholders also discussed the importance to collaborate at the state level and with utilities to enact broader policy changes that will impact the County and City.
 - State level actions
 - Local support to change state policies related to renewable energy and energy efficiency is important
 - Partner with statewide advocacy groups
 - Building code
 - Support changes to state law to require new buildings to be solar ready, climate smart, EV ready, LEED standard, etc.
 - Renewable energy
 - Remove barriers to 3rd party sales, increase the renewable energy portfolio standard (REPS), affordable housing development
 - Include socially responsible investment (SRI) options in retirement plans
 - Utility actions
 - Encourage Duke to go 100 percent renewable so Buncombe Count and Asheville reach their goals easily
 - Ask for incentive programs and rebates, especially for large renewable energy development opportunities
 - On-bill financing should be offered – makes process easier and reduced friction
 - Business
 - Bring in the business community – they have responsibility here too. Could have a “adopt renewable energy” program
 - Can also create voluntary programs and tap philanthropy dollars, such as a voluntary revolving investment fund
 - Important to get “Main Street” involvement in the transition
 - Advocacy groups
 - Partner with statewide advocacy groups like the NC Sustainable Energy Association
 - Have a larger role in advocacy for change at the state-level
 - **Workforce Development:** Stakeholders raised several priorities related to workforce development for the transition:
 - Begin with education in school systems and provide community college degree programs for renewable energy and energy efficiency jobs
 - Include assessment of economic development and population migration when creating workforce development programs
 - Create jobs that allow young people to live here
 - Incentives for local hires (would need to overcome state barriers) and/or require businesses to put a percentage back into community workforce training

- Connect renewable projects to Buncombe County and North Carolina jobs
- Connect to local industries – manufacturing, education, medical sectors on the transition
- **Quick Wins:** Opportunities for “quick wins” were discussed by one group and included:
 - Public installations of renewable energy (e.g. in a public square) or rooftop PV and on other public buildings
 - Clear communication about cost savings from investments
 - “Thermometer” or other tracking device in a public space to show progress
 - Installations at schools or breweries alongside tours
 - Transit station installation
 - Demonstration projects in neighborhoods
 - Solar-ready rehabs
 - Reinvestment programs – sell and recycle REC money now

Part IV. Closing

To close the meeting, participants each shared one word about how they felt after workshop discussion. The list of words is included below, with number of times each word was said in parentheses:

- Encouraged (4)
- Hopeful (3)
- Excited (2)
- Grateful (2)
- Invigorated (2)
- Curious
- Engaged
- Inspired
- Optimistic
- Supported